

Curtin Business School

**An Examination of the Theory and Practice of Project Management
Knowledge and its Transferability in Western Australia**

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**This thesis is presented for the Degree of
Doctor of Philosophy
of
Curtin University of Technology**

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DECLARATION

To the best of my knowledge and belief, this thesis contains no material previously published by any other person, except where due acknowledgement has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

Signature

Date

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I would like to acknowledge and express my gratitude to a number of people who made this endeavour possible:

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ABSTRACT

Acceptance and understanding of project management tends to be limited by project managers (PMs) who have a specific technical training and follow one or two major theories on project processes. Consequently, project managers may encounter difficulty in being 'recognised' by employers and moving from one professional discipline to another.

The current research examines knowledge areas applied 'in the field' by project managers (PMs), and provides them with knowledge about the constancy of application of project theories; further, a new model of what constitutes PM and enables flexibility for PMs is suggested.

As there was little extant literature about PMs being able to transfer from one professional discipline to another, or to what degree different knowledge areas were applied, it was determined that exploratory research was appropriate.

The results strongly indicate that organisations that rely on programs and projects to support the delivery of their strategic objectives will benefit from implementation of the project management revised hypothetical model (Figure 13). The model incorporates the nine knowledge areas of The Project Management Institute (USA) and six knowledge areas extracted from the PM methodology PRINCE2. Further, the additional focus of People Specific Management (PSM) at Level 3 of the revised hypothetical model (Figure 13) is recommended.

Qualifications for PMs do make a difference! In addition to demonstrating the importance of PM qualifications to augment PM's successful transfer across disciplines, further research is suggested regarding the need for training to be 'compulsory' and follow the developmental levels described in the up-to-date model developed during the research (Figure 13).

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CHAPTER 1: The Problem

1.0 Introduction

Project management is an established method of management in the construction industry and the information sector and, although there is a growing acceptance across industry sectors of the concept of managing by project (Jugdev, Mathur & Shing Fung 2007, p.560), it remains only partly accepted in other industries. Consequently, due to the partial acceptance and understanding of project management as comprising specific processes, project managers may encounter difficulty in being recognised by employers and moving from one professional discipline to another.

Mullaly (2006, p.23) argues that “no recognisable standard has emerged to assess project management practices”, and without a recognised standard it is difficult for employers to make a judgment as to the capabilities of project managers. In their study of the use of consultants in the public sector, Pattenaude and Landis (1979) discuss the benefits and otherwise of the utilisation of consultants; i.e., not only to achieve results, but to transfer knowledge to the organisation. Pattenaude and Landis (1979, p.414) note that “one outgrowth of the focus on efficiency has been the effort to transfer new management tools, ideas, and techniques to the public sector from other public sector organisations or the private sector”. This may well have implications for project managers as they are ‘drafted in’ to undertake projects.

Thus, it is of interest for project managers to determine whether the project management knowledge base is transferable, enabling them to transfer from one discipline to another; “at the overall level project management knowledge appears to be generic across industry sectors” (Crawford & Pollack 2007, p.93). Similarly, it is necessary for them to determine:

- what constitutes project management,
- what are the core project management knowledge areas, and
- in what ways current project management ideas can be developed to progress the discipline.

These questions relate to the competence of a project manager, especially as senior management may have no base of working knowledge of the discipline and, thereby, rely entirely on the project manager's abilities. In practice, for program/project managers and senior management, the merit of a project manager's technical knowledge versus the merits of possessing general management skills is a constant dilemma and continuing point of discussion.

Therefore, the current researcher's objective is to map the process of project management (PM) as it relates to the use of specific knowledge areas, identify the nature of the required PM knowledge areas and investigate the transferability of the core of project management knowledge areas.

Winkles (1986, p.277), in his study of the learning hierarchy, examined the nature of problem solving situations; "however, in natural problem solving situations, the same conditions seldom apply, and often different people solve the same problem by different means, transferring from the personal stores of knowledge and skills". Winkles' study goes on to describe how learners exposed to different strategies will apply the strategies to organise their storage of skills and, in fact, apply them in the acquisition of new skills.

In his text on marketing management, Kotler (2000) discusses topics in common with project management; e.g., communication management, stakeholder management, program management and determining corrective action. All of these are common themes in the project management context, with the discussion of bringing a product to market being the cited project by the Project Management Institute USA (2000, p.4). Similarly, the divergence of the concept of managing by project across different sectors is the basis of the current research.

As projects are a part of many organisations (Blomquist & Müller 2006, p.52; Koskinen 2004, p.18; Mullaly 2006, p.72) and project management is increasing in type, range and popularity (Shenhar & Dvir 2007, p.93), the researcher seeks to examine the 'path' that project management is taking in relation to PM accreditation and education, enabling its practitioners to be 'flexible' in the application of their management knowledge across disciplines. The continual growth of project management warrants research into the PM knowledge areas, to assist both industry

and practitioners in seeking and obtaining the relevant knowledge, to contribute to the delivery of projects. This research is therefore relevant to industry, as the employers' of project managers and to both current and future project managers, in terms of further education and personal development. This research will provide insight into 'the making' of a PM and provide the benefit of an understanding of the project management knowledge areas and their use, to assist educators, employers and practitioners to structure development programs.

1.2 Background

Indicative of the many questions associated with the current research, Morris (1994, p.213) goes into great detail in discussing various aspects of project management and the history of project management, both ancient and new.

So, what does this saga of projects and management reveal? What lessons can we derive? Is there a pattern underlying the effective management of projects? How transferable are the insights from one field to another, between space and building, say, or nuclear power and information technology?

Morris (1994) and Meredith and Mantel (1995, p.7) make much of the influence of the Cold War and the Military and Arms industries in the development of project management, but no discussion takes place on the transferable nature of project management skills from one professional discipline to another.

Butler (1973, p.85) examines the nature of organisational conflict with regard to project managers utilising project management methodology and processes to achieve outcomes in an operational environment.

To achieve maximum intensification of managerial attention, the project manager (PM) may be assigned full responsibility for the achievement of project objectives, subject only to an overall project plan approved by top management. At the other extreme, the PM may be assigned coordinative (or simply monitoring) responsibility for the integration of project related activities, while existing patterns of functional responsibility and directive authority remain largely intact. In most instances, PMs are required to sub contract with either the functional organization or an out-side concern for the specialized efforts required to accomplish project tasks; e.g., design, development, production, test, support, and other services. Conflict emerges from this secondary overlay of project authority and responsibility.

The preceding extract highlights the unenviable situation within which PMs are often required to operate. In terms of the current research, interest is in what knowledge and processes project managers ‘draw upon’ in operational circumstances and what could assist the PM in terms of knowledge development and educational programs.

1.3 Statement of the Problem

After conducting an initial review of books, professional texts, journals and internet World Wide Web sites, although there is a plethora of data about project management, it appears that there is a shortage of published information on the transferability of project management knowledge. Cicmil and Hodgson (2006, p.112) suggest that “several important writers in this field maintain that little radical examination of the intellectual foundation of project management has been done within this stream of research, arguably since the 1960s”. In searching for a central theme or paradigm to truly conceptualise project management, it would appear that no such paradigm exists (Shenhar & Dvir 2007, p.95). Without this foundation, it is difficult for project managers to ensure they are gaining/acquiring the optimum knowledge base to equip them in their future endeavours in the management of projects. As a ‘sessional’ university lecturer, the researcher is cognisant of the fact that project management appears to be taught predominantly in engineering and construction faculties and, therefore, currently there exists a tendency to focus on its mechanics; i.e., the processes, tools and techniques of the discipline. However, there is a growing awareness that project management is suitable and, arguably, preferable to be taught in schools of management and business. Therefore, a formal literature review was conducted to identify common themes in the field of project management, its generic nature and that of management. The primary focus was the determination of the transportability of commonly accepted core project management knowledge areas as identified in a hypothetical model derived from extant literature.

The initial project management core knowledge areas identified as a base for the research were comprised of the nine project management knowledge areas detailed by the Project Management Institute (2000); viz., scope, time, cost, integration, quality, human resource use, communications, risk-management and procurement. These areas of core project management knowledge also are proposed by Buckle and Thomas (2003, p.434) and suggested by the Australian Institute of Project Management (2006a;

2007) as necessary components of any course in project management. The New South Wales Department of Education and Training has produced a training kit for Registered Training Organisations (RTOs) that facilitates project management training by focusing on these nine core knowledge areas.

The following extract from the Department of Education and Training Skills Kit (2005) outlines one understanding of the nature of project management:

The structure and contents of the Project Management Skills Kit (PMSKit) are based on the assumption that project management is not an entry level qualification and that learners are likely to have existing training and qualifications.

Although the kit is organised around topics that relate to each of the main project management ... areas in the qualification, a holistic approach to assessment is recommended.

The PMSKit therefore provides information and activities that will enable delivery in a structured learning environment and also assist self-directed learning and assessment based on real workplace experiences.

The skill areas covered in the PMSKit are those required when working in a single project, or in one area of a large complex project. They are:

Scope management

Time management

Cost management

Quality management

Human resources management

Communications management

Risk management

Procurement management

Management of the application of project integrative processes

Interestingly, the Project Management Institute (2000, p.6) suggests that a project manager needs to have knowledge of the sector and its expected end products:

It is important to note that many of the processes in project management are iterative in nature. This is in part due to the existence of and necessity for progressive elaboration in a project throughout the project life cycle; i.e., the more you know about your project, the better you are able to manage it.

Arguably, some projects require a greater level of technical ability or 'know how'. McCreery (2003, p.233) and Whitten (2005, p.98) discuss the merits or otherwise of a project manager possessing sufficient technical knowledge and whether the project manager who is not deemed sufficiently technical will be working with a disadvantage. Zwikael and Globerson (2004, p.1546) argue that "only a proper mix of project manager's know-how and organizational support will improve the quality of planning and project results"; this suggests their belief that 'know-how' is important when selecting a project manager. Whitten (2005, p.98) considers "the project manager who is not sufficiently technical in his or her chosen industry will be working with a handicap". In relation to the current research, the question as to the transferability of project managers across disciplines without the relevant technical background is of interest. Whitten (2005, p.100) believes that a level of relevant technical knowledge is required for a project to be successfully managed, but the issue of what amount is sufficient is contentious;

Sufficient is not a precise, quantifiable term, but it does represent 'that which is needed' ... sufficient is intended to represent that which is needed to yield an effective outcome. If a project manager is not sufficiently technical, then his or her level of technical astuteness is less than preferred and may result in the project manager being less effective than expected or required.

Yeates and Cadle (1996, p.73) state their belief that technical knowledge is a requirement; "obviously, if an IS project is to be successful, then all concerned must know in detail what they are trying to do. Unfortunately, in too many instances, this is very far from being the case". The project management literature is ambiguous as to the technical knowledge requirements for project managers. Contrary to the above view, Whitten (2005, p.101) suggests a preference for strong project management skills over strong technical skills; "as a general rule, it is far better for the project

manager to be strong in project management skills and weak technically than to be strong technically and weak in project management skills”. This is a view supported by the Tasmanian Government (2006) when discussing its guidelines for the selection of a project manager. In relation to the current research question, the arguments appear to highlight the fundamental dilemma for PMs between having strong technical ability or strong project management skills.

Good project governance may provide a bridge between the level of technical skill and project management knowledge. Therefore, the research includes examination of the impact of the introduction of project governance. Weaver (2005, p.4) has identified relevant issues on project governance and the tools that make it possible; such as:

The need for skilled people to plan and manage portfolios, programs and projects:

The value of a PMO.

The need for a recognized project management career path.

The need to recognize project management competencies and the need to implement systems to develop appropriate skills and competencies at all levels of the organisation.

The supporting technologies:

Enterprise project management systems.

Web portals.

Integration with other corporate systems.

Data design issues.

Folta (1998, p.1010), in his study of governance and uncertainty, discusses the nature of learning in incremental stages throughout a project, the relevance of this being that the ‘structure’ of governance may support the project manager’s own knowledge base in learning to operate in a new sector. Although Weaver (2005) discusses project governance in the case of the integration of a Project Management Office and the use of Enterprise Project Management Solution software and even the need to recognise

project management competencies, there is no discussion on the nature of the competencies or the effect of any of the above on a project manager's ability to transfer from one discipline to another.

However, there is discussion among authors on the importance of project governance (Blomquist & Müller 2006, p.62); e.g., Maylor (2001, p.93) argues "I would go further and say that more than 80 per cent of all problems at the project level are caused by failures at a board level in firms to provide clear policy and priorities". For Morris, Jamieson and Shepard (2006, p.469) "good governance is clearly critical to the effective management of projects and programs".

1.3.1 Organisational Culture and Styles

Organisations develop their own policies, procedures, level of authority and propensity towards risk-taking. As a result, a project manager, whether engaged as a consultant or as an employee, needs to gain an understanding of the existing culture in which he or she is expected to manage projects and be successful. In effect, as noted by the Project Management Institute (2000, pp.32-33), the particular style and personal nature of the project manager is of interest in relation to the research:

A team proposing an unusual or high-risk approach is more likely to secure approval in an aggressive or entrepreneurial organization.

A project manager with a highly participative style is apt to encounter problems in a rigidly hierarchical organization, while a project manager with an authoritarian style will be equally challenged in a participative organization.

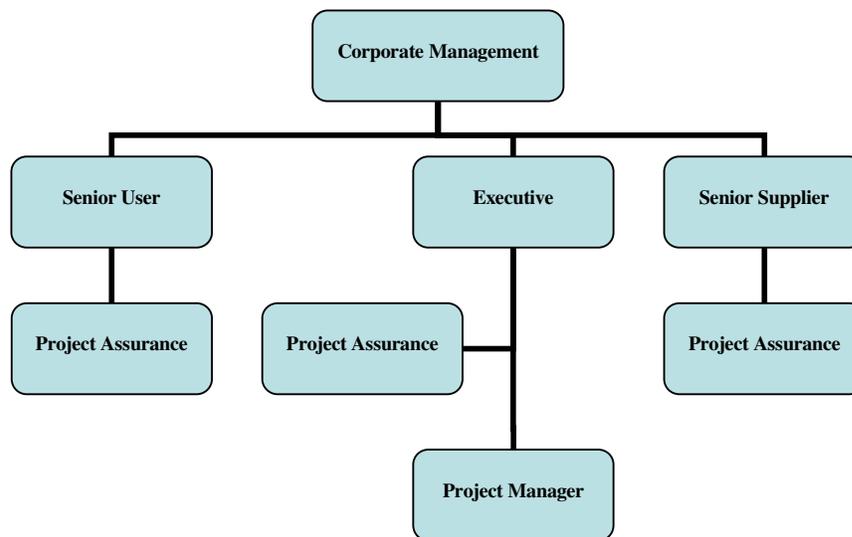
1.3.2 Project Management Methodology

PRINCE2 (**PR**ojects **IN** Controlled **E**nvironments) is a structured method using a system of processes and templates for effective project management. It is used extensively by the UK Government, private sector and internationally. However, although the PRINCE2 method is in the public domain, it is a registered trademark of the Central Computer and Telecommunications Agency (CCTA).

The primary focus throughout PRINCE2 is on the business case that provides justification for the project. The business case drives all the project management processes, from initial project set-up through to the finish of the project.

The outline of the PRINCE2 concept (see Figure 1) sets out the project management board structure according to system principles. Arguably, the inclusion of a representative ‘senior user’ and ‘senior supplier’ in conjunction with the use of ‘project assurance’ in the PRINCE2 methodology may assist in overcoming any shortcoming in the project manager’s technical knowledge. Similarly, it provides a possible method to ensure that the area of ‘know how’ as discussed by Whitten (2005) is one that can be managed by the use of an appropriate project management methodology/model.

Figure 1
PRINCE2



Source: (Office of Government Commerce 2003, p.14)

It has been argued (Office of Government Commerce 2003, p.16) that “the senior user is accountable for ensuring that requirements are fully and accurately specified, making sure that what is delivered is fit for purpose and that the solution meets users’ needs within the constraints of the Business Case”.

The **Senior Supplier** is one whose “role represents the resources providing design, development, facilitation, procurement, and implementation of the project’s products. The Senior Supplier must have the authority to commit or acquire the necessary resources” (Office of Government Commerce 2003, p.16).

Project Assurance is used to provide “the check that the project continues to meet its specification, the required standards and the business case. Project Assurance is the responsibility of each Project Board member, however the role can be delegated, but it must be independent of the project manager” (Office of Government Commerce 2003, p.18).

In addition to ‘project assurance’, given a choice between strong technical or strong project management skills in relation to the current research question, the PRINCE2 methodology may assist in assuring project sponsors that the latter skills are preferable because the technical aspects are ‘backed up’ by the structure of the project board.

Conversely, there is the view that training in any methodology does not a Project Manager make! Therefore, one of the core aspects of the current research is the anticipation of identifying what PM knowledge areas would assist a project manager to transfer from one sector to another and operate effectively. Further, it may be found that the project manager indeed does require a certain level of underpinning technical knowledge to operate effectively in a given professional discipline.

Worsley (2005, p.2) suggests that the focus should not be on learning project management methodologies, but on project management education.

So what’s the problem? It’s the difference between education and training. Not sure what the difference is? Just check your reaction to your child coming home and saying they had sex training rather than sex education at school today!

Senior executives want people skilled at running projects. People skilled at running projects are distinguished by their attitudes, their skills, the responsibilities they intuitively accept, and the tasks and procedures they follow. It is also a well-researched finding that the best predictor of project performance is level of previous project experience. None of these are outcomes from the typical accreditation five-day training course, including two days of tests.

Like many authors on project management, Yang (2007), Prabhakar (2005), Soderlund (2004), Yeates and Cadle (1996) and Baccarini and Collins (2005) discuss project timelines and the necessity to manage them. Often, the project manager is required to work to a critical time frame and within a very tight budget, requiring the project manager to make very quick decisions that will affect not only on the timing of a

project, but its financial viability. Preparatory work undertaken by the project manager in the early stages of a project, such as a feasibility study, a reverse client brief and establishing an effective monitoring system, will provide an effective control framework for the life of the project. Where such preparatory work has not been undertaken, the project manager can find the process of decision-making and monitoring far more difficult.

Project time management may be considered a skill that is transferable, as in the early stages of a project many people's input generally is sought to ensure a 'complete picture' is obtained. The process will produce at least an initial timeline and the continuing involvement of the 'team' will facilitate the project manager in the decision-making process with regards to time management.

Morris (1994, pp.218–219) points out the perils of not giving a project the attention it deserves at the very early stages:

First, a project will be in great danger of encountering serious problems if its definition is not right and is not developed properly, if its objectives, standards, technical base and general strategic planning are inadequately considered or poorly developed, or if its design is not firmly managed in line with its strategic plans.

However, unlike the current research, Morris (1994) does not discuss the issue of a project manager transferring from one discipline to another, or whether project management knowledge is generic enough to allow an effective transition.

1.3.3 Examples of Project Management Application

Soderlund (2004, p.186), Cicmil and Hodgson (2006, p.113) and Ayas (1996, p.136) are among many authors that take the view that project management is not only applicable but becoming a core activity in organisations; also project management is responsible increasingly for the delivery of the corporate strategy (Srivannaboon 2006, p.89), (Lan-ying & Yong-dong 2007). The Project Management Institute (2000, p.4) takes the approach that macro project management is a skill which can be applied in almost any industry or a range of projects including:

- developing a new product or service;

- effecting a change in structure, staffing, or style of an organisation;
- designing a new transportation vehicle;
- developing or acquiring a new or modified information system;
- constructing a building or facility;
- running a campaign for political office; and
- implementing a new business procedure or process.

Morris (1994, p.p. 32-33) mentions a number of diverse projects such as landing a man on the moon and building the Great Wall of China; however, he goes on to question the knowledge and skill base in project management:

Despite its long development, the concepts and techniques of project management now available to the general practitioner, however advanced and specific they may be, are often inadequate to the overall task of managing projects successfully.

The preceding extract is inconclusive in that it highlights the shortcomings in concepts and techniques available to project managers, but no solutions are offered. In relation to the current research question, it identifies a belief that more could be done to educate project managers and supply them with the necessary management skills. The focus of the research, then, on the core project management knowledge areas and their transferable nature will contribute towards understanding and successfully implementing the process.

Arguably, project management is about managing, and even leading, people; a view supported by Prabhakar (2005, p.53), Morris, Jamieson and Shepard (2006, p.471) and Brown (2006, p.2). Consequently, project management is not about making technical decisions. If you have a high risk project, it's sensible to have a technical project manager/project coordinator to work hand-in-hand with the project manager. But once technical project managers start undertaking project management, it may be argued, it becomes increasingly difficult for the great majority of them to remain technically focused. As a result, it may be that a non-technical but experienced manager trained in project management is the preferred option to manage a project and, therefore, an intimate knowledge of an industry is not a prerequisite for the PM position.

1.4 Purpose of the Study

The current research is undertaken to examine the nature of Project Management and the knowledge areas applied by project managers across professional disciplines.

Previously, a survey by O'Shea (1998, p.22) suggested that there is tentative evidence that project managers may be able to transfer between different disciplines and operate effectively at the macro-level. However, for the project manager seeking to transfer across professional disciplines there are a number of hurdles to overcome, and a dearth of evidence as to how best to achieve the desired result at a micro-level. Hurdles include senior management's lack of awareness of managing by project as a subset of their business processes, the organisational culture and technical credibility. These issues are compounded when there is a concern with peoples' perceptions of the competence of a project manager who may have no technical knowledge base in the discipline.

As previously discussed, the continual growth of project management suggests the need for research into the PM knowledge areas that will assist industry and practitioners in securing the relevant PM knowledge, to contribute to the delivery of projects. This research is therefore focussed on establishing results relevant to industry, as the employers' of project managers and current and future project managers, in terms of their further education and personal development. This research will provide insight into what PMs are currently using, in terms of knowledge areas and provide the benefit of an understanding of the project management knowledge areas and their use. The research will provide assistance to educators, employers and practitioners to structure development programs.

1.5 Research Questions

The minor research questions are derived from the primary question, having been informed by the researcher's personal experiences as a project manager and project management consultant, as well as relevant reading of extant literature in the field of project management. Further, the questions were formed to seek information about a range of issues that confront project managers transferring from one discipline to another.

The major question to investigate is: *What core Project Management knowledge areas are transferable from one discipline to another?*

Answers to the primary question will assist educators' in project management and PMs who seek to transfer from one professional discipline to another, by supplying them with an understanding about the knowledge areas required for a PM to be successful.

1.5.1 Project Management Education

Cook and Granger (1976, p.327), in their review of PM education in American Colleges and Universities, discovered the discipline of project management was more likely to be taught in Engineering departments as a totally developed course, but taught only as a topic within business units. Further, Cook and Granger (1976, p.327) discovered the most common methods of PM instruction to be lectures, discussion and/or case studies. This is of interest as the current research seeks to clarify whether or not project management knowledge is transferable. Additional research is required to ascertain the nature of, and degree to which, the knowledge actually is being taught. In conducting training of project managers within the Registered Training Organisation structure (RTO), the benefits of 'role playing' and 'scenario building' have been noted. This follows a pattern whereby the facilitator 'sets the scene' over a given period of time and participants develop the project plan or manage the project. McCreery (2003, p.241), in his research into the training benefits of using project simulation, supports this method as increasing project management knowledge and abilities.

Therefore, responses to several sub-questions will enable the researcher to answer the major question, and to operationalise the research; e.g.

- What is Project Management?
- How does extant research literature describe the fundamental activities of a Project Manager?
- What management knowledge areas are commonly used by project managers in different professional disciplines?

- What additional management knowledge is used by project managers in different professional disciplines?

1.5.2 Importance of Research

It is expected that the current research will lead to a greater understanding of the knowledge areas utilised by project managers, thereby, assisting those who wish to transfer from one professional discipline to another. Further, the research will enhance the project management body of knowledge as a result of identifying those knowledge areas currently used by practitioners of PM.

Research findings will be useful for academics, business executives, project decision-makers, program managers, project managers and project participants. The linking of theory and practice will lead to the highlighting of issues in relation to project managers transferring the PM knowledge areas from a discipline in which they have 'grounding' to an unfamiliar discipline.

Although there is a considerable body of knowledge about the general transferability of educational skills, there is no comparable research in the area of the transferability of the project management knowledge areas; thus, the current research will seek to address the shortfall in relation to PM knowledge areas and provide impetus for ongoing research.

1.5.3 Theoretical Framework

Implementation of a Project Governance framework will result in the better management of a program of projects required to achieve the organisation's objectives and of projects themselves. To achieve this would require changes to management practice and procedures.

Key issues addressed by a Governance framework are clarification of project management roles and responsibilities, controls and approval processes, risk and issues management requirements and the linking of project deliverables to the organisation's objectives.

Project Governance extends the principle of Governance into the management of individual projects. Today, many organisations are developing 'Project Governance

Structures'. A Project Governance structure is different to an Organisation Structure in that it defines accountabilities and responsibilities for strategic decision-making within each project. This can be useful, particularly, to project management processes such as change control and strategic (project) decision-making. Project Governance relates to the research in that it may be relied upon to initiate incoming project managers into a particular organisation's way of managing projects. The Tasmanian Government (2006), on its web site, provides 'tips' and 'guidelines' on Project Governance.

1.5.4 Discipline Comparisons

Comparisons between project managers operating in the professional disciplines of Construction, Information Technology and Marketing, due to their representation in the West Australian membership base of the Australian Institute of Project Management (AIPM) are fundamental to the current research; however, research participants will be sought from a range of PM disciplines.

1.5.4.1 Sub Questions

1. Is Project management a discipline that facilitates individual practitioners applying their knowledge across different sectors?
2. Are project managers in differing sectors utilising common knowledge areas?
3. Are project managers able to utilise knowledge from one sector in a different sector?
4. Can project managers apply a large amount of knowledge from managing projects in one sector (in which they are familiar), to another sector (in which they are unfamiliar)?

1.6 Scope of Research

The scope of the current research is limited to the discussion as to whether or not a project manager trained in one sector, and possessing PM knowledge areas gained within that sector, can then transfer to a different sector and operate effectively. As with any research there are constraints and limitations, not least of all involving budget and time. Due to these, the research has endeavoured through the use of an appropriate

survey strategy to ascertain which knowledge areas are being applied by project managers in different business sectors and clarification of knowledge areas used across those sectors; similarly, it is intended to identify knowledge areas that are unique.

1.7 Thesis Outline

The current thesis is structured on the basis of five chapters and is supported by appendices with examples of the research instrument and a comprehensive reference list on available relevant publications.

The first chapter has indicated an overview of the study, including the initial impetus for the research, its background and the researcher's intentions; included are the research sub questions from which the hypotheses to be tested will be generated.

The second chapter focuses on relevant extant literature, identifies a gap in the current body of knowledge about project management and formulates a current hypothetical model derived from the literature which summarises how project managers operate.

In order to test the identified hypothetical model, the third chapter is developed to establish the methodology of the current research by which the model will be tested.

The fourth chapter presents the findings of the current research. Findings are discussed in the light of evidence from research participants. In addition, results are related to the specific research questions and their evaluation leads to the development of an updated version of the model hypothesised in Chapter 2.

The fifth chapter enables the researcher to summarise the overall thesis, provide a concluding 'so what' from the findings and make recommendations for future research.

CHAPTER 2: REVIEW OF RELATED LITERATURE

2.0 Overview

The current research was designed on the basis of ideas encompassed within extant literature; this included a review of books, journals and internet World Wide Web sites relevant to the topic. Existing evidence was sought of problems that may face project managers seeking to operate in a different professional discipline than the one in which they were trained initially, and to identify and refine appropriate research variables. Using the Curtin University library search facilities, an additional search was conducted for existing theses and journal articles related to project managers (as opposed to functional managers) seeking to transfer PM knowledge areas from one discipline to another.

2.1 Skill vs. Knowledge

Lee (undated, p.76) in her paper on *Thinking Curriculum: framing research/education*, addresses the area of 'best practice' in doctoral research; her interest, as with the current research, is on the concepts of 'skill' and 'knowledge'; she argues "it is often easy for questions to be silenced and deflected in this highly charged political climate, yet crucial to see the field as still open to such questioning. Among the most urgent of these questions are the assumed distinction between 'knowledge' and 'skill' in most current framing documents, and a frequent implicit collapsing of skill development into the provision of methodology courses, often de-contextualised and generic". An example of this is a project management methodology such as PRINCE2 (Office of Government Commerce 2003), where the need for 'on the job' skill development for project managers may be alleviated, as the methodology underpins the nature of technical knowledge requirements of a project.

In initiating the review of literature, the decision was made to review not just the current discussions of project management knowledge, but to include the discussions of transferring knowledge in a general sense. It was considered this would lead to a broader view of the topic and, potentially, a greater understanding of the likelihood, or otherwise, of a project manager being able to transfer from one 'known' sector to an 'unknown' sector.

Cicmil and Hodgson (2006, p.128) have expressed their view that greater engagement of project managers in the various debates as to what constitutes a successful project and how better to manage them, is crucial to moving the body of PM knowledge forward. In seeking to understand the nature of knowledge applied in projects, particularly if there are any generic approaches to project management, i.e., approaches applicable across professional disciplines, it is realised there is a need to explore the concepts of knowledge and knowledge transfer.

2.1.1 Skills and Knowledge Transfer

Project Management relies on knowledge areas such as tacit knowledge, which underpins the knowledge, learning processes and abilities of individuals. Thus, although there has been substantial research into these areas (Grant, 1996), little has been completed in general literature that provides adequate insight (van Donk & Riezebos 2005, p.75) on the focus of the current research; *viz.*, the transferable nature of the project management knowledge areas.

In their research into the influence knowledge management has on project success, Reich and Wee (2006, p.11) suggest “results show that the PMBOK[®] Guide has a strong bias toward explicit and declarative (i.e., “how”) knowledge, and pays less attention to tacit and causal (i.e., “why”) knowledge”. The PMBOK[®] is a publication by the Project Management Institute (USA) ‘A Guide to the Project Management Body of Knowledge’; arguably, this is adopted as a de-facto world standard in PM.

The role project managers play in the acquisition and application of knowledge is outlined in the belief of Anderson (2006, p.22) that “the role of the project manager is to facilitate this blending of knowledge, e.g., by establishing and opening up arenas and creating channels for information and knowledge sharing”.

Furthermore, Morris et al. (2006, p.4) have noted that “knowledge is one element of competency - others being skills and behaviours”; therefore, the matter of ‘praxis’ appears relevant. The understanding of praxis, according to Cicmil (2006, p.30), is that it “becomes central to theorizing skills, knowledge, and competencies. ‘Praxis’ is a form of action that is fundamentally contingent on context-dependent judgement and situational ethics”. The question, then, is whether or not one can, or should, assume that a project manager needs to possess all the discussed theorizing, knowledge and

predetermined competencies (Gray & Larson 2006, pp. 330-333) to enable a flexible approach that is relevant to any given project situation. Further, does any methodology currently available, provide assistance to the PM to be truly flexible and, therefore, able to be transferred, or is it all down to ‘on the job experience’? In the context of the current literature, no discussion takes place on the contribution of a PM being ‘praxis aware’ as to their ability to transfer between differing sectors.

The concept that project management is a knowledge-based discipline and that tacit knowledge is a significant source of the acquisition of this knowledge is discussed by Jugdev (2004, p.23) who suggests that “intangible assets seem to be undervalued in project management, yet they potentially play a crucial role in project management as it is a knowledge based discipline, and tacit knowledge and social capital are significant sources of knowledge exchange”. The area of tacit knowledge is of particular interest in the current study as it is a relevant and yet difficult to quantify (Horner Reich & Yong Wee 2006, p.18; Koskinen 2004, p.13).

Bresman, Birkinshaw and Nobel (1999, p.443) found that “the transfer of tacit knowledge was more difficult to accomplish than the transfer of more articulated knowledge”. Thus, the current study used the Morris et al. (2006, p.10) assertion that “project management ... is as much about craft knowledge as codified knowledge – tacit as explicit”, as the basis for researching further into the area of project management knowledge and its application across different sectors.

2.1.2 ‘On the Job’ Knowledge

Arguably, knowledge gained on the job can be classified as contributing to one becoming unconsciously or consciously competent, a view supported by Cicmil (2006, pp.32-34), Zwikael and Globerson (2004, p.1547) and Ayas (1996, p.131); the latter argues that “this implies that all individuals involved in a project are engaged in a constant process of learning”. Questions arise as to how one can identify this type of knowledge, and whether or not it is transferable to another sector; i.e., is there a certain amount of knowledge learned that is generic enough for successful transfer to occur?

Cohen and Levinthal (1990, p.133) discuss areas such as problem-solving skills, contextual knowledge and complementary expertise. In the current study, these topics are considered to suggest that, over time, project managers (particularly those working

in project management consulting firms) will develop the ability, as a result of a broad range of experiences, to apply their stored knowledge and concepts to different scenarios. Delisle and Olson (2004, p.331) suggest that “a shared ontology may indeed be the key to reusing knowledge and reducing the need to ‘reinvent the wheel’ in managing projects”.

Similarly, Cohen and Levinthal (1990, p.129) discuss the concept of ‘absorptive capacity’ in relation to a firm’s prior level of related knowledge.

With respect to the acquisition of knowledge, Bower and Hilgard (1981: 424) suggested that memory development is self reinforcing in that the more objects, patterns and concepts that are stored in memory, the more readily is new information about these constructs acquired and the more facile is the individual in using them in new settings.

Therefore, absorptive capacity may suggest that project managers’ experiences over time will develop their ability to reapply their stored knowledge and concepts across different business sectors and disciplines.

Experience adds to a PM’s underpinning knowledge which is gained through formal training and education, and one might conjecture that ‘overall knowledge’ is likely to be transferable from one business sector to another. Crawford and Pollack (2007, p.93) in their study of project management knowledge and practice, discuss the generic nature or otherwise of project management knowledge; viz., “at the overall level project management knowledge appears to be generic across industry sectors”. However, they go on to suggest that “use of project management practices appears to be generic ... but not across industry sectors”. It is anticipated the current research will add to the discussion by providing data to further clarify the generic nature of PM knowledge.

McDaniel and Schlager (1990, p.154) discuss various aspects of learning in relation to the transferring of problem-solving skills.

Although our data do not directly address this issue, one possibility is that, in the course of discovery, the learner acquires heuristic procedures for discovering a particular kind of knowledge about the domain, and these procedures are then applied in the context of the transfer problem.

The above is both interesting and relevant to the current study, in that, if project managers acquire heuristic procedures in one sector, the question remains as to which procedures they will be able to apply, and where, in an unfamiliar sector.

2.2 Knowledge Requirements

If a project manager has demonstrated the appropriate knowledge to become certified as a PM (Australian Institute of Project Management 2006b), there is an industry expectation that s/he has adequate qualifications to manage a project; however, the question remains as to whether those qualifications are sufficient for them to transfer to a project in an unfamiliar sector. Does the qualification actually make an individual unconsciously competent and able to adapt to managing almost any project by applying basic or previously learned skills and knowledge to achieve a successful project outcome? Arguably, there is merit in establishing commonly accepted standards and a set of management tools and techniques readily identifiable to contribute towards meeting the objectives of projects; these would benefit not just project managers, but industry groups, executives and employees.

Brown et al. (2006, p.4) argue that the PM who is focused on management of the project, will gain significant advantages in the 'marketplace' due to having 'articulated knowledge'. Similarly, decades earlier, Butler (1973, p.91) emphasised the need for a project manager to possess the ability to organise professionals from diverse disciplines.

The PM must organise a cohesive team of professionals of diverse disciplines who work for him in a limited sense, and who have their own difficulties adjusting to new working relationships within the dynamic project team.

The above extract implies that there is a need for emphasis on the softer, human interaction skills when training and educating project managers. In their study of critical factors in the implementation and planning of major projects, Bryson and Bromiley (1993, p.334) suggest that the softer skills, particularly in communication, are indeed a factor in project success.

A theory of the planning process needs to relate: (1) the technical structure of the planning process; (2) the decision-making or 'soft' structure of the planning process, including the communication and conflict resolution strategies employed.

2.3 Learning

The learning process tends to be different for everybody; no two people have the same background, learn at the same pace or, in fact, retain the same knowledge even when presented with the same initial material (Koskinen 2004, p.14). In a project management context, the establishment of a project management office (PMO) often is envisaged as an entity assisting organisational learning; i.e., from a PM perspective (Hobbs & Aubry 2007, p.83).

Thus, the concept of learning in incremental stages throughout a project is presented by Folta (1998, p.1010) in his study of governance and uncertainty; viz.:

uncertainty can only be resolved by learning - actually undertaking the project in stages so that learning can occur incrementally. Projects involving greater degrees of endogenous uncertainty have a wider range of potential outcomes, and hence, more growth options.

2.4 Knowledge Transfer

Some fifty years ago, in response to a question about the nature of 'transfer', Jensen (1956) discusses aspects such as the effective learning of one concept in relation to applying that knowledge to the learning of another. Thus, Jensen (1956, p.72) believed that transfer is a 'given'; it is merely a case of how much transfer takes place.

The question is not, 'does transfer occur'? Rather we might concern ourselves with these questions: 'How much transfer can be expected'? 'What kind of transfer effect is appropriate'? and 'How can we maximize appropriate transfer effect'?

Nevertheless, in the last decade, it has been argued that the transfer of knowledge is problematic; e.g., Desforges and Lings (1998, p.391) suggest that:

some related empirical work shows it is not that knowledge application is never achieved but that the achievements are disappointing, patchy and uncertain. The problem is not well understood and practice is necessarily pragmatic.

Table 1, below, sourced from Koskinen (2004, p.14), further highlights the discussion as to whether or not knowledge is transferable. Cognitive epistemology is described as an interpretation of the firm’s world, and as understanding of it increases, there is a concomitant increase in knowledge. Autopoietic epistemology describes all knowledge as data and, therefore, it is the interpretation of the data which is crucial and, yet, problematic; e.g., how many times do we think we have conveyed a clear message, only to find it has been misinterpreted?

Table 1
Cognitive vs. Autopoietic Epistemology

Cognitive Epistemology	Autopoietic Epistemology
Knowledge is a representation of a pre-established reality	Knowledge is creational and based on distinction-making in observation
Knowledge is universal and objective	Knowledge is history dependent and context sensitive
Knowledge is transferable	Knowledge is not directly transferable

Source: Koskinen, 2004, p.14

Consequently, the comparative table is introduced to highlight further the difficulty of identifying in extant literature any identifiable agreement on whether or not knowledge is transferable. If focus is on the project manager, as actually employed by the firm or working on its behalf, then one is in the realm of cognitive epistemology and, therefore, knowledge acquired should be transferable indeed.

2.5 Knowledge Management

Snider and Nissen (2003, p.5) state their belief about knowledge management and project management and how the current BOKs (Bodies of Knowledge) do not address the management of knowledge adequately. They claim the reason is that “because project management BOK are generally silent on ... details, they are apparently incomplete in potentially significant ways”. The suggestion is that a greater focus is required on knowledge, and knowledge management in particular, in the BOKs utilised by PMs. Other researchers concur with the view that there appears to be a dearth of empirical studies with a focus on project management knowledge (Jugdev, Mathur & Shing Fung 2007, p.561).

2.5.1 Lesson Learned

The management of knowledge, in the sense of ‘lessons learned’ in the project management perspective, is an area given great focus by the professional assessment process conducted under the guidelines of the Australian Institute of Project Management (Management 2006). However, often due to a lack of the firm’s requirement to document such lessons learned, ‘Assesseees’ find difficulty with the production of sufficient evidence to satisfy the assessment criteria. This leads to the assessment process being extended, as the ‘Assesseees’ seldom are given sufficient time by the firm to document the lessons learned due to the pressure to initiate the next project.

Snider and Nissen (2003, p.5) describe the usefulness of capturing experiences (lessons learned) in order to increase the available knowledge base.

In this perspective, knowledge is recorded and stored for future use. That is, the principal flow of knowledge is across time, rather than across organizational or geographical space in the “solution” perspective. The emphasis is on capturing practitioner experiences so that others may have access to and potentially learn from them, in the sense of “learning from the mistakes of the past” and avoiding “reinventing the wheel”.

In their case study into the transfer of project management knowledge within an organisation, Eskerod and Skriver (2007) sought to establish, by encouraging project managers to discuss and share their experiences, whether or not knowledge transfer would take place. Among other things, they discovered that the personal characteristics and values of the project managers proved to be a barrier to knowledge transfer; i.e., “the values of the project managers did not encourage knowledge transfer” (Eskerod & Jorgen Skriver 2007, p.117). This may suggest that greater emphasis needs to be placed on encouraging project managers to learn and practise the use of greater ‘people specific skills’ so that they can be more open.

van Donk and Riezebos (2005, p.82) argue that “literature shows that for the core activities in project-based organisations three types of knowledge have to be distinguished: entrepreneurial, technical and project management knowledge”. Does this mean that project managers limited to one or two areas of knowledge would be

less able and likely to transfer across differing disciplines? No discussion was available on this topic.

In a study of the use of consultants in the public sector, there was a discussion on the pros and cons of utilising consultants; not only to achieve results, but to transfer knowledge to the organisation. The researchers, Pattenaude and Landis (1979, p.414) noted that “one outgrowth of the focus on efficiency has been the effort to transfer the new management tools, ideas, and techniques to the public sector from other public sector organisations or the private sector”. This has implications for project managers as they are ‘drafted in’ to undertake projects.

2.5.2 Knowledge Gaps in Projects

In their paper on project risks and knowledge gaps, Regev, Shtub and Ben Haim (2006, p.18) state that “a simple, yet effective, definition of the knowledge gap is the gap between what we should know to guarantee project success and what we really know at a given point in time”. The implication of this concept is that, regardless of their experience in the sector, even if a project manager has the ability to identify knowledge gaps on a given project they will need to action the knowledge by applying it across different sectors to demonstrate their ability to transfer said knowledge. However, no discussion on this takes place.

In an attempt to introduce the difficulty of examining extant literature with regard to ascertaining whether project management knowledge is transferable across different sectors, Bresman, Birkinshaw and Nobel (1999, p.444) argue that “the concept of transfer is also difficult to capture. The issue here is that no definite distinction between transfer of knowledge and creation of new knowledge exists”.

2.6 Managing Conflict

Project managers can find themselves in a state of personal, team and organisational conflict when incumbent functional managers resist the PM’s introduction of change in order to satisfy the scope of a given project (Butler Jr 1973, p.85; Sutterfield, Friday-Stroud & Shivers-Blackwell 2006, p.26). This phenomenon is particularly relevant in situations where the PM is responsible only to senior management; in particular, it can occur when a functional manager resents the direct access to executives that is

available to the PM. Arguably, there is a responsibility on the PM to understand and manage the situation, as it is paramount to project success. This is an area where the masculine and feminine values such as those discussed by Hofstede (1980) can be paramount; the 'softer' feminine skills which value relationship building may prove invaluable.

2.7 Personality and Style

As with other authors, Prabhakar (2005, p.54) lists numerous industries and their sectors in which project managers operate. Further, in his study into the leadership style of project managers and their ability to switch between different styles and the affect this has on project success, Prabhakar (2005, p.54) states that "qualitative data shows that there exists a relationship in leadership style and a high success level on a project". So, if a project manager has been able to apply switching leadership styles used within one sector with which they are familiar, will they be able transfer to another sector and apply the same styles and be effective? No discussion takes place on this subject.

Often, project managers are judged on their ability to display critical reasoning and high-level decision-making, factors often associated with leadership. Arguably, these factors are seen by team members as important, especially as the project manager is the person able to secure the necessary resources to facilitate the project objectives (Hua Chen & Tau Lee 2007, p.550).

In their investigations into the relationship between project managers' personality types and project success, Rozenes, Vitner and Spragget (2006, p.7) and Dvir, Sadeh and Malach-Pines (2006, p.37-38), cite areas of interest and influence; e.g., uncertainty, complexity, pace and novelty. Central in relation to the current research is the concept of a project manager having acquired a particular style (personality) in one sector, and whether or not that style would lend itself to application in a different sector with which they were less familiar. Although the research is focused on project management knowledge areas in different sectors and any generic areas that become apparent, it is considered that knowledge gained in one sector may influence the project manager's style and result in either a positive or negative effect when applied in a different sector.

2.8 Selecting the Project Manager

Arguably, a project manager needs to build and establish both a personal and professional credibility (Mantel Jr et al. 2001, p.35) and know how to tap into the various structures of an organisation to obtain support when required. A lack of credibility due to various perceptions such as insufficient technical knowledge or the politics of the organisation, may influence the 'buying decision' when firms engage the services of a project manager (Bourne & Walker 2006, p.17; O'Shea 1998, p.34).

Powell and Buede (2006, p.34) suggest that "of all the decisions management makes in doing new product development, none may be more crucial to success than the choice of a project manager". In addition, there is a variety of descriptions regarding what makes, or does not make, a good project manager and what to look for when selecting a PM for a project. Buttrick (2005, pp.75-77) discusses the attributes to be mindful of when selecting a project manager:

***Inherent enthusiasm.** The need to understand the role and what it entails or be willing to learn and have the aptitude to cope. Look for the spark that tells you they really want this to succeed.*

***High tolerance of uncertainty.** They need to be able to work effectively across the organization, without formal line authority or rank authority. They need to be able, especially in the investigative stages, to deal with the many potentially conflicting needs and signal as the project hunts its way toward a solution.*

***Excellent coalition and team-building skills.** People are the heart of projects, both as team members and stakeholders. If the project manager hasn't the necessary "people" skills, the project is unlikely to be a success.*

***Client orientation.** This means they need to understand the expectations and differing success criteria of the various stakeholders, especially the project sponsor.*

Poor reasons for selecting a project manager, if taken in isolation, include the following:

***Availability.** The worst reason to appoint a person is simply because he or she is available.*

Technical Skill. *This can be useful on a project but not essential. The project manager can draw on technical experts ... The danger when the project manager is also the technical expert is that he or she will concentrate on the technical area of interest to the exclusion of everything else.*

Toughness. *The 'macho' project manager who closely supervises every aspect of the project, placing demand upon demand upon the team (or else!).*

Age. *Gray hairs do not necessarily indicate a better project manager ... Maturity in project management comes from exposure to a wide range of different situations and projects.*

The concepts in the preceding extract relate to the current research by confirming the need to investigate the ability of project managers to transfer their PM knowledge between different professional disciplines, inasmuch as the personal qualities of the project manager appear relevant; a view supported by Hyvari (2006). Bourne and Walker (2006, p.9), suggest that “even when the project manager lacks formal power, he/she needs to be able to influence people and outcomes”. This view, supported by Sutterfield, Friday-Stroud and Shivers-Blackwell (2006), is arguably a knowledge area of great significance as it relates to the ability to ‘get things done’ and could be considered a generic knowledge base. Further, the discussion by Buttrick (2005) on perceived technical knowledge being a poor reason for selecting a PM, supported by evidence from Brown, Adams and Amjad (2006, p.2), is of particular interest as technical knowledge remains a point of discussion at many ‘gatherings’ of project managers.

2.8.1 Types of PM Knowledge

Reich and Wee (2006, p.13) discuss their belief that the PM needs both project management knowledge and ‘domain’ knowledge; they report that “two broad types of knowledge had been identified: project management knowledge and project domain knowledge. Each type of knowledge is important to the successful completion of the project”.

Similarly, Sutterfield, Friday-Stroud and Shivers-Blackwell (2006, p.32) argue that “regardless of the organizational project, the project manager must be adept at project planning and managing multiple project variables simultaneously throughout the

planning and implementation phases to maximize the chance of keeping the project within its projected scope”. Resultant questions are whether one should assume that project planning is a generic knowledge area and the skills, therefore, transferable; or whether, in order to plan successfully a PM requires a basis discipline knowledge within the sector.

One may suggest the issue is one of deciding whether a project manager should be more of the generalist, or more of a specialist, or both? If the project manager is a generalist, s/he would be considered more flexible and able to operate across sundry different professional disciplines. As a project manager who has transferred from an initial base in construction, to business and information technology projects, my experience is that being more of a generalist is advantageous as the flexibility that comes with such knowledge allows for greater management of the ‘unknown’. Also, Morris and Shepard (2006, p.468), in their examination of the revision of the Association of Project Management Body of Knowledge (APM. 2006), explained that “no sector stands out as having its own distinctive pattern – which in itself is an important finding”. They were referring here to a survey ascertaining what aspects of project management were applied in different industry sectors.

2.8.1.1 *Earned Value*

Rozenes, Vitner and Spraggett (2006, p.11), in their discussion on project controls, argue that “the dominant multidimensional project control system is the [Earned Value] EV system, which is used worldwide. This system integrates cost and scheduling and is simple to implement with many computerized programs available in the marketplace”. Therefore, there is the question of whether a project manager equipped with the ‘know how’ of EV and the ability to utilise the computer package is able to more easily transfer across different sectors.

2.8.2 *Project Manager vs. Functional Manager*

Meredith, Mantel and Samuel (1995, p.111) have articulated the difference between a PM and a functional manager; a difference which can become blurred in organisations where the roles are allowed to overlap.

The functional manager is a direct, technical supervisor. The PM is a facilitator. Knowing the technology, the functional manager has the basic technical knowledge required to oversee and advise subordinates on the best ways to handle their work and solve problems met in the normal course of that work. The PM may have detailed technical knowledge in one or two specific areas, but he or she rarely has knowledge in depth beyond these few areas. The PM, therefore, cannot apply knowledge directly, but instead must facilitate cooperation between those who have the various kinds of specialized knowledge and those who need it. This distinction between facilitator and specialist is a key element in the decision to use generalists as PMs rather than specialists

In relation to the current research, interest is in clarifying the perceptions, or at least perceived perceptions, of what constitutes project management and therefore project managers. The idea of PMs being generalists is particularly relevant to the discussion of training and education currently being undertaken and that may be suggested for PMs.

2.8.3 PM Selection Factors

In selecting a PM there are a number of factors suggested by the Department of Education and Training (2005, p.15) which contends that a PM needs to be able to:

manage self with little direction and apply technical and organisation knowledge to organisation issues and problems and be able to work in a variety of work contexts

apply their skills, including conceptual, technical, interpersonal skills to the management of team leaders and to a variety of different workplace situations and be able to readily move to other teams carrying out the same type of work

exercise the competencies they hold within routine and non routine procedures and systems of an organisation, and, within organisation guidelines and delegations, to be able to exercise appropriate judgement manage the appropriate use of resources and services, and manage organisation processes

The above extract relates to the current research as it suggests that the PM is required to be flexible and able to adapt to differing situations. However, it does not discuss whether that flexibility would facilitate the person 'crossing over' from one professional discipline to another.

The Tasmanian Government (2006) project management website discusses in detail its view on the selection of a project manager, stating clearly the belief that project management knowledge is at least as important as knowledge of the business area concerned. In his research into the influence of the 'Novelty Factor' and its effects on project management, Brockhoff (2006, p.33) claims "it is apparent that the past experience on the job, together with systematic and analytical thinking, counts less than the combination of creativity, motivation, and the abilities to plan and organize". Also, the Tasmanian Government (2006) discussion extends to the issue of communication and the benefit of the project manager having an understanding of the business in question; issues relevant to the current research.

The Project Manager is the key person around which the project will ultimately revolve, and appropriate selection of the Project Manager and Team, resourcing of the Team and delegation of authority is critical.

For large and/or complex projects, project management knowledge and experience are at least as important as knowledge of the business area(s) in which the project is being run. However, Project Managers should have, or seek to obtain, knowledge of the business area, in order to be able to communicate effectively with Project Team members and project clients to ensure that business issues and concerns are addressed.

The Project Team should include at least one person with an intimate knowledge of the business area, and preferably more. It may also be an advantage if one or more Project Team members are novices or inexperienced in the business area, so that fundamental issues are not overlooked, or simply taken for granted. Many issues can be uncovered through the process of explaining a project to those participants with little background in the area. Finding the right combination of people with project management, technical and business area skills, let alone people who are able to function effectively as a team, can be quite a balancing act for those people involved in projects.

2.8.4 Managing a Project Utilising Multiple PMs

In a study of organisational conflict, Butler (1973, p.89) suggests that different leadership styles and skills may be appropriate for different stages of a project. This has implications for the current research as, strategically, it may be optimal to have project managers with different skills and knowledge being able to manage different aspects of a project at different points in time.

In fact, a uniform leadership style may not be optimal over the project life cycle during which the desired behavioural mode tends to evolve from creative discovery, through innovative development of relevant ideas, through programmed production and test of the end product, and finally to introduction and support of the product in use. The decision context also tends to change from one with a highly technical bias to one in which value is placed increasingly on integrative trade-offs involving time and cost as influential variables.

Another example of the potential use of alternative project managers at different stages of a project's life cycle is discussed by Lecoeuvre-Soudain and Deshayes (2006) in their research into the relationship between marketing and project management. Although during their discussion they do not discuss directly the notion of utilising different project managers at different stages, they do stress the importance of various forms of communication (marketing) at different points in a project's life cycle. Arguably, this may require different communication skills and, therefore, introduces the possibility of requiring different project managers at different phases.

2.8.5 Flexibility

In his discussion on managing unexpected projects, Wearne (2006, p.98) notes that "in case F, the project manager had some previous experience in organizing emergency work to repair a stadium. No lesson from that experience was reported as applicable in this case, but it is possible that it contributed to his performance and to the acceptance by others of his taking the lead in directing all the operations on the site". The preceding quote would appear to support the position that project management knowledge is transferable, as the PM in this case was able to 'draw on' previous experience and apply it to the project in question.

2.8.6 Project vs. Program Management

Norrie and Walker (2004, p.48) refer to the use of balanced score cards in project management; they discuss the importance of leadership and then outline the benefits of utilising a balanced score card approach (Norrie & Walker 2004, p.51) in terms of the relationship this creates between the project and the strategy of the organisation.

Similarly, Anderson (2006, p.18) discusses the links that the project manager should have with the subsequent results of their given projects; "the project manager should

also be responsible for exploring, defining, and proposing the links between the desired changes in the base organization and the project deliverables”.

However, while agreeing with the principles as discussed, the preceding authors do not treat as separate the different roles between, say, a project manager and a program manager (Powell & Buede 2006). Further, the concept of the balanced score card (BSC) and the continual relating of the project to the strategy is covered, arguably, in the PRINCE2 methodology (Central Computer and Telecommunications Agency 1999) by the formation of Stage Boundaries and regular referral to the Business Case. No discussion takes place (Norrie & Walker 2004) on the likely effect of a project manager utilising the BSC approach or being able to transfer from one work discipline to another.

Another approach, supported by Blomquist and Muller (2006, p.55) and the Department of Education and Training (2005), involves differentiating between a ‘program management’ and a ‘project management’ approach; e.g., Table 2 below compares project management with the program management approach of a traditional organisation. The Office of Government Commerce (2007, p.4) suggests, “programmes deal with outcomes; projects deal with outputs”, this would appear to support the view expressed in Table 2 below, that program management has a different focus to project management. The Office of Government Commerce (2007, p.4) further suggests, “programme management as the action of carrying out the coordinated organisation, direction and implementation of a dossier of projects and transformation activities (i.e. the programme) to achieve outcomes and realise benefits of strategic importance to the business.” Pinto (2007, p.479), outlines his belief of the difference between projects and programs, “related projects managed in a coordinated way to obtain benefits and control not available from managing them individually”, again this would appear to support the view that a different approach, such as that suggested in Table 2 below, may be appropriate.

Table 2
Programme vs. Project Management

Programme Management Approach	Project Management Approach
Summary: Managing delivery of predetermined outcomes in plans	Summary: Management of uncertainty using cross functional teams
Aim: Imbed controls to minimise variations	Aim: Imbed responsiveness and problem solving
Characteristics: <ul style="list-style-type: none"> • Predictable • Maintaining normal operations to meet corporate objectives • Hierarchical structure of work teams • Departmentalisation of functions and personnel • Employment based on notions of ongoing and full-time • Structured functional work arrangements • Formalised plans as the basis for development and delivery services and products • Bureaucratic structures with rules; procedures • Habits and working practices are generated by experience 	Characteristics: <ul style="list-style-type: none"> • Dynamic and changing • Management of uncertainty • Open ended, iterative structures • Self-directed work teams operating a cross functional boundaries • Loosely structured work arrangements • Flexible structures and processes designed to accommodate change and innovation • "One size does not fit all" approach • Bounded by agreed constraints • Utilising specialist skills • Temporary-exist only for the life of the project and have a life cycle

Source: Department of Education and Training Skills Kit (2005)

Although the focus of the current research is on project management knowledge and its application, it is important to note the perceived distinction between program and project management.

2.9 'On the Job' Training

There is an old saying that 'you can't beat experience' (Hua Chen & Tau Lee 2007, p.544); Snider and Nissen (2003, p.8). In particular, Turner, Keegan and Crawford (2000, p.2) support this assertion; they argue that "experience is the raw material of learning and knowledge creation, and the extent to which it contributes to competence development is dependent upon the structures and strategies used by individuals and organizations to learn by experience". In relation to the current research, it is beneficial

to identify what learning and knowledge is essential to PMs, and determine whether it is transferable across professional disciplines.

Nevertheless, Brown et al. (2006, p.1) and Turner, Keegan and Crawford (2000, p.2) discuss the fact that experience *per se* is not enough; it needs to be accompanied by other factors such as structured reflection and observation, possibly leading to abstract concepts and generalisations that enable the learner to develop theories for performance improvement. Maylor (2001, p.97) argues that “the issue of ‘learning from experience’ has already been shown to be a weakness”. Consequently, the relevance to the current research is in relation to whether the education of project managers needs to encompass reflection and observation about skill development and whether, if this were to be, it would assist project managers to transfer across professional disciplines?

2.10 Project Governance and Benchmarking

Will the existence of a governance process stifle the incoming PM from utilising their existing knowledge because they feel constrained by the structure provided (Andersen 2006, p.19; Crawford 2006, p.81), or will they be supported by such a structure and able to adapt their knowledge to the governance process and successfully transfer to the different sector (Eslerod & Jorgen Skriver 2007, p.112)?

Crawford (2006, p.76) argues that “this change from focus on the individual project and practitioner to project management as an organizational capability reflects the wider adoption of project management”.

If organisations are adopting project governance and benchmarking practices, will these features facilitate the easy transfer of project managers? Bresman, Birkinshaw and Nobel (1999, p.441) state that “benchmarking has demonstrated the potentially great benefits of best practices transfer”, which would appear to suggest the belief that benchmarking will facilitate the transfer of knowledge and, possibly, across different sectors.

2.11 Training Courses

There are many and varied training courses in project management endorsed by the Australian Institute of Project Managers, hereinafter the AIPM (Australian Institute of

Project Management 2006a); they range from three day presentations to three year Masters level degree courses, as shown in Appendix 1.

The AIPM nationally-approved courses encompass the nine knowledge areas propertied by the Project Management Institute (USA). The same knowledge areas are utilised and expanded upon by the AIPM to form the basis of their Registered Project Manager program. The program entails an approved AIPM assessor working with individuals to demonstrate competencies at the desired level (Management 2006).

Further McCreery (2003, p.234) discusses the benefits of simulation exercises in the training of project managers and expresses his belief that, regardless of their background, participants benefit from this mode of training; “the participants all come to the simulation exercise with their own levels of knowledge in various project management knowledge areas”. This may well have implications for the project management educators to consider generic scenarios, enabling the easier application of the knowledge gained across a variety of disciplines.

2.11.1 Problem Solving

In their discussion on stress and how project managers in the IT sector cope with it, Richmond and Skitmore (2006, p.8) state “it was noted that only one of the five female subjects, in contrast with four of the seven male subjects, use problem solving as a coping strategy. Also, the university-educated subjects employed problem-solving and planning strategies more often than high-school or TAFE-educated subjects”. The question is whether or not, as with the use of scenario mechanisms in training (McCreery 2003), precedence should be given to problem solving when educating project managers, thereby enhancing opportunities to transfer between sectors. However, no discussion takes place on this subject.

2.12 AIPM Project Management Certification

RegPM (Registered Project Manager) is AIPM's project management certification program. ‘Certification’ is the term used by professional institutes to recognise individuals who have attained a defined and recognised professional standard (Morris., Jamieson & Shepherd 2006, p.462). In accordance with established criteria, those who have achieved the standard are eligible to receive a ‘certificate’; hence the term

‘certification’. RegPM is a competency-based workplace assessment program which requires candidates to compile a logbook of evidence to demonstrate to a qualified assessor that they are competent at one of three levels.

The competency standards against which the award is granted are based on extensive research into national and international best practices in project management at the levels of work found in most private and public sector workplaces. The research shows that the RegPM levels equate to levels 4, 5 and 6 of the Australian Standards Framework (ASF) which, when aligned to the Australian Qualifications Framework (AQF), are at Certificate IV, Diploma, and Advanced Diploma levels respectively, as detailed in the following Table 3:

**Table 3
Comparison of PM Qualifications**

Reg PM level	ASF	AQF	A Project Manager who...
Project team member (QPP)	Level 4	Certificate IV	Supports assists with or contributes to a project...
Project Manager (RPM)	Level 5	Diploma	Plans and manages a project...
Master Project Director (MPD)	Level 6	Advanced Diploma	Directs or manages projects/programs/portfolios...

Source: (Australian Institute of Project Management 2006b; Management 2006)

The courses and associated assessments emphasise the basic nature of project management skills, and both the course delivery and assessments are conducted with participants across various industries and professions.

Morris et al. (2006, p.5) suggest that “from a more promotional viewpoint however, one can foresee the threat of litigation over the failure to appoint someone to manage an important project who is not certified. There is evidence of this now beginning to happen, particularly in North America”.

2.13 Project Methodologies / Frameworks

When researching project management, it is evident that there are a number of widely recognised and supported methodologies and frameworks. The following examples are not only the most referred to, but they are commonly accepted methodologies and

frameworks. It was felt the examination of these would lead to the identification of related constructs and areas of focus in terms of the transferability of project management knowledge. Further, it was anticipated that, by gaining a deeper understanding of the more widely accepted and utilised methodologies, a hypothetical model of project management knowledge and its possible transferability would emerge.

2.13.1 The Project Management Institute (USA)

The Project Management Institute (USA), hereinafter PMI, is most well known in PM circles for its publication of A Guide to the Project Management Body of Knowledge (Project Management Institute 2000). First published in 1996, the guide was revised subsequently in 2000 and 2004. Among PMs it is often the publication most likely to be ‘on the shelf’ and held with a certain degree of reverence (Andersen 2006, p.16; Crawford 2006, p.77; Horner Reich & Yong Wee 2006). The following extract appears to indicate the belief by Horner Reich and Yong Wee (2006, p.21) that the ‘Guide’ would benefit from including both the ‘who’ and the ‘why’ in terms of the differing phases in a project.

With respect to explicit project management knowledge, the PMBOK® Guide mainly consists of declarative and procedural knowledge - that is, what to do and how to do it. In its current form, it does not contain much causal knowledge - that is, why to do a particular process or action. It also does not give the project manager guidance as to "who" should be involved in project processes.

Whilst the PMI does not promote the publication as a methodology, experienced PMs often adopt it as a standard, and the framework of nine knowledge areas contained within it is used to manage the process of the management of projects.

Project management is the application of knowledge, skills, tools, and techniques to a broad range of activities in order to meet the requirements of a particular project. Project management is comprised of five Project Management Process Groups – Initiating Processes, Planning Processes, Executing Processes, Monitoring and Controlling Processes, and Closing Processes – as well as nine Knowledge Areas. These nine Knowledge Areas center on management expertise in Project Integration Management, Project Scope Management, Project Time Management, Project Cost Management, Project Quality Management, Project Human Resources Management, Project Communications Management, Project Risk Management and Project Procurement Management (Project Management Institute 2004)

2.13.2 PRINCE2

PRINCE2 (**P**ROjects **I**N **C**ontrolled **E**nvironments) is a methodology that is promoted as containing a system of processes and templates for the management of projects. It is used extensively in the UK by government and the private sector and appears to be gaining acceptance internationally. The primary focus throughout PRINCE2 is on the business case. It is the business case that provides justification for the project, and drives all the project management processes from initial project set-up through to the finish of the project; PRINCE2 defines a project as:

A management environment that is created for the purpose of delivering one or more business products according to a specified business case.

Another definition of a project might be ‘a temporary organisation that is needed to produce a unique and pre-define outcome or result at a pre-specified time using pre-determined resources’.

PRINCE2 additionally supposes that those responsible for the project will not have experience of working together to produce a similar set of outcomes or results for the same Customer in the past; that co-ordination between those working on the project will need to be well organised; and that the responsibilities between those undertaking the work, those managing it and those sponsoring it will need to be clearly defined.

A PRINCE2 project, therefore, has the following characteristics:

A finite and defined lifespan.

Defined and measurable business products.

A corresponding set of activities to achieve the business products.

A defined amount of resources.

An organisation structure, with defined responsibilities, to manage the project.

Each project falls within a specific business context. A project may be stand-alone, or may be one in a sequence of related projects, or may form part of a programme or corporate strategy.

A project, by its nature, is a temporary structure, created to achieve a specified business benefit or objective. When the work has been completed, the project is disbanded (Central Computer and Telecommunications Agency 1999, p.22).

2.13.3 ISO 10006

The ISO standard consists of a set of co-ordinated and controlled activities with start and finish dates, undertaken to achieve an objective conforming to specific requirements, including the constraints of time, cost and resources.

In the following extract from the Project Management Partners web site, Pither and Duncan (Pither & Duncan 1998) are less than complimentary with regard to ISO 10006.

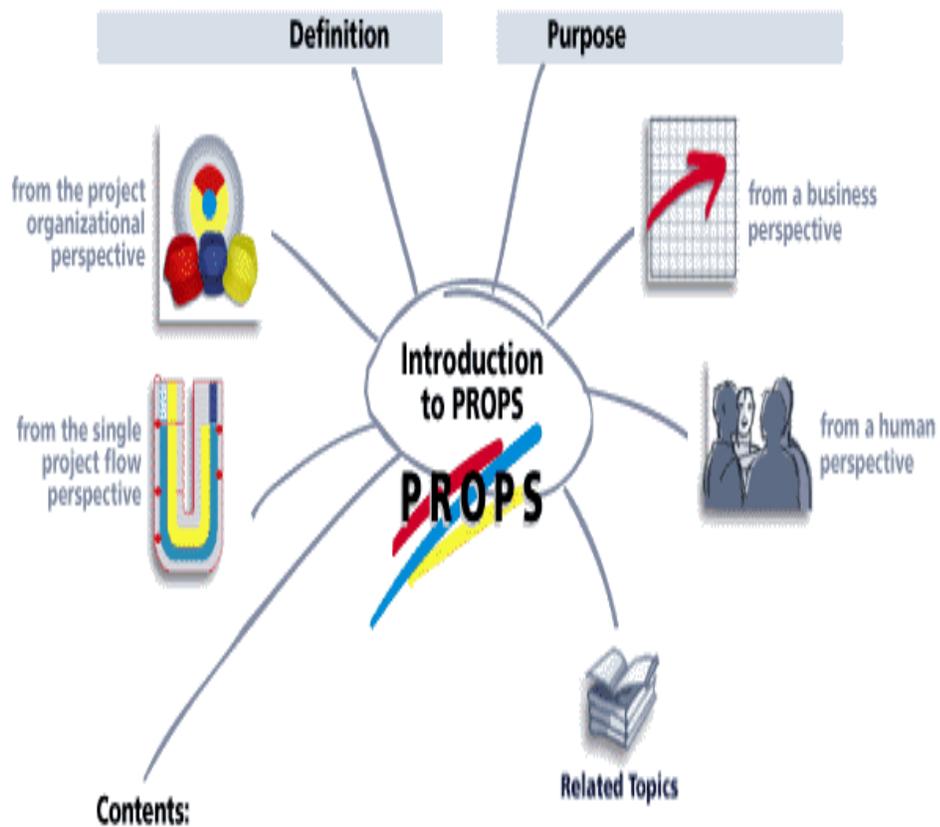
ISO 10006, Quality management — Guidelines to quality in project management, claims to provide 'guidance on quality system elements, concepts and practices for which the implementation is important to, and has an impact on, the achievement of quality in project management'. In our opinion, application of this document is more likely to have the opposite effect: if attention is given to the items identified in the standard at the expense of others critical to project management, the result could very well be a poorly managed and unnecessarily costly project that is compliant with the standard.

In summary, the use of ISO 10006 as a reference document for an organization involved in project management, for project management procurement, or by project managers themselves is not recommended.

2.13.4 PROPS

PROPS is a project management methodology developed by the international European-based company Ericsson (2003); the three parts of PROPS, a project steering model, a project management model and a project work model, are shown in the project workflow component in Figure 2.

Figure 2
Introduction to PROPS



Source: Ericsson web site (Ericsson 2003)

PROPS General Project Model describes WHAT activities to perform in a project. Since PROPS is generic, it is not tied down to specific projects or working methods. Methods, tools, work instructions and measurements that specify HOW these activities are performed are not included. Uncoupling the project model from methods and tools makes it future-proof, and allows new methods and technologies to be explored within an organization.

In PROPS, the project flow is depicted as a U, representing three different models:

A project steering model, indicated by the red-framed part of the U, representing the strategic management process, including business and strategic project decisions.

A project management model, indicated by the blue part of the U, representing the project management process for project planning, procurement, integration and control.

A project work model, indicated by the yellow part of the U, representing the operative processes applied in the project. (Ericsson 2003)

Crawford (2006, p.75), outlines her view that project management is a field developed by social discourse with the desire to encompass the field of project management in a recognizable framework.

Project management can be seen as a socially constructed field of practice that has developed from tools and techniques designed to support the management of major projects, from the conversations of practitioners and from their deliberate efforts to define a field of practice through definition of a distinct body of knowledge and associated standards. Fundamental to this is recognition of projects as phenomena with shared characteristics.

All four methodologies above have aspects in common and are used in various parts of a business and across businesses in an industry; however, there is no discussion in the literature on the ability of a project manager trained in any of the above methods being able to transfer their PM knowledge between different professional disciplines and operate effectively.

2.14 Change Management

Often, it is discussed in project management circles that projects by their nature introduce change and, by doing so, require the planned inclusion and management of stakeholders (Legris & Colletette 2006). Stakeholders are discussed later in this chapter; however, Anderson (2006, p.16), in his discussion on treating different projects in different ways, has a particular focus on what are described as ‘Renewal Projects’.

The task perspective might be a suitable approach when the project is supposed to deliver a well-known specified product to an external client on a certain date and at an agreed price.

We claim that it is not an appropriate perspective when an organization strives for internal renewal. In such cases the preferable approach would be to look at the project as a vehicle for change.

Where projects are not well defined, as may be argued in the case of change management projects, and merely issued to a project manager in terms of ‘these are the benefits we require’, the nature of the benefits across projects within the same sector can vary considerably. Thus, the question is whether or not the previous experience of the PM in a sector has any bearing on outcomes. Similarly, one may ask whether or not it is the case of an area where the PM’s prior knowledge is likely to come to the fore.

2.15 Historical Background

There appears to be a general consensus on what has and continues to differentiate project management from other organisational management processes. Various authors discuss projects as producing something unique, introducing change, ideal for implementing strategy and reacting to market opportunities. These same authors discuss projects as having, a definite beginning and a definite end, being goal orientated, using limited human resources, being constrained financially and often crossing organisational boundaries (Meredith & Mantel 1995; Pinto 2007; Project Management Institute 2004; Whitten 2005; Yeates & Cadle 1996). Project management may well have been used back in the days of the pyramids and, demonstrably, in more recent times. During the Cold War, the United States of America sought to speed up its ability to produce weapons and to gain and keep an advantage; as a result they invented the Program Evaluation and Review Technique

(PERT) as part of the Polaris missile submarine program (Peter. Morris 1994, pp.30-31).

PERT was later modified with a Work Breakdown Structure (WBS). The process flow and methodology adopted by the military eventually was adopted by private enterprise (Peter. Morris 1994, p.p. 32-33).

At the same time, the DuPont Corporation invented a model called the Critical Path Method (CPM). CPM is similar to PERT in that both use the network technique and both use 'arrows' to represent activities, although neither group became aware of the other's work until early 1959. Fundamentally, DuPont's construction business, where technologies and processes were known at large, was quite different from that of the Navy. In contrast to the uncertain R & D world of Polaris, DuPont could calculate how long each activity would take with some accuracy; e.g., so many feet of pipe laid per hour. Thus, the 'practices' of project management appear to be engineering and mathematics focussed (Soderlund 2004, p.184). Haga and Marold (2004, p.32) suggest that "since the development of CPM and PERT in the 1950s, the techniques have been the subject of hundreds of research papers, but little work has been done in the area of the time-cost trade-off problem"; an inference from the tendency of PMs to rely on tools and techniques that, to some extent have been proven.

Nowadays, including in the current study, it is important and relevant to look at additional skills considered to be part of the project manager's 'tool kit'. Bourne and Walker (2006, p.19) argue that "the experienced project manager knows when to push and when to pull; and how he or she does this depends on the style of the project manager. Some aspects of style can be learned but others are personal traits and can either be modified or enhanced to be effective". Thus, there is a dawning realisation that project management is not all about being technical or familiar with a particular methodology, but relies to a large extent on the personal qualities of the PM.

2.16 'Soft Skills'

Muzio, Fisher, Thomas and Peters (2007, p.31) suggest that soft skills are an established need whether you are looking at corporate strategy or even a tactical perspective. There are many examples of projects that are completed 'over' time (Hameri & Heikkila 2002, p.143), 'exceeding' budget and 'failing to deliver' the

envisaged benefits despite the previously discussed range of methodologies and frameworks developed to assist in the management of projects. Further, many examples exist of project management tools used for tracking the harder technical aspects of projects (Zwikael, Shimizu & Globerson 2005, p.459); three examples of project specific software are Primavera, ProLog and MS Project. However, there appears to be little information on the softer skills that may be useful in PM (Hyväri 2006).

Bourne and Walker (2006, p.6) in their discussion on the importance of relationship management, stakeholder identification and management indicate that “it is important to understand that relationships do not begin and end with the initiation and closure of a project, but are continuing aspects of the life of a professional project manager”. Brockhoff (2006, p.33), in finalizing his discussion on the ‘Novelty Factor’ in project management and how project managers deal with such instances, suggests “we can conclude that a project manager who interacts with his or her team, who can motivate and who can critically or logically evaluate project performance, achieves the best project results”. Sutterfield, Friday-Stroud and Shivers-Blackwell (2006, p.32) take the idea further and state their belief that “in order to be effective and achieve successful project outcomes, project managers must become skilled at managing and resolving conflict between various project stakeholders while keeping the project on time and within budget”.

2.16.1 Stakeholders

The identification and management of stakeholders, and their expectations within the project context, is a point of discussion relevant to the ‘softer side’ of PM knowledge. In addition, time management (regarded as a process or even a technical skill) as discussed by Ramo (2002, p.571) also could be said to be relevant in terms of knowing when to do the ‘right’ things. Sutterfield, Friday-Stroud and Shivers-Blackwell (2006, p.27), in their discussion on resulting failures associated with insufficient stakeholder management, present their definition of a stakeholder; i.e., “a generally accepted definition of a stakeholder is any individual or group of individuals that are directly or indirectly impacted by an entity or a task”. Their view also is supported by the Project Management Institute (2000, p.208).

Arguably, the success of the project management process hinges on the identification of every stakeholder as early as possible; especially, as failure to do so is to insert unnecessary risk into the project (Bourne & Walker 2006). Stakeholders not only hold the information critical to the project initiation, but their involvement leads to its ongoing stability; arguably, this is particularly relevant to, and evidenced by, public sector projects where failure to engage the stakeholders has resulted in the ‘not in my backyard’ response (NIMBY). Once identified, the stakeholders should be informed throughout the project of its progress, with a particular focus of supplying to the relevant stakeholders with relevant information of interest to them (Legris & Collette 2006; Powell & Buede 2006; Sutterfield, Friday-Stroud & Shivers-Blackwell 2006).

Bourne and Walker (2006, p.8), discuss their view that if the needs and wants of a project manager and stakeholders are not realized in regard to a project, the project could not be considered a success; i.e., “this aspect of stakeholder management - looking inward - is often neglected. If the project manager's needs and wants have not been satisfactorily delivered, it cannot be termed a successful project, because all stakeholders have not had their interests fulfilled”. One may add to this perspective the view that, as the PM is required to set aside their personal wants and needs for the ‘greater good’ of the project, the ability to do this would be a personal trait that may well assist the PM who seeks to transfer between different sectors.

Legris and Collette (2006, p.66) in discussing the importance of stakeholder and change management practices in IT projects, suggest:

Attention is still too heavily focused on the technical questions, and not enough on the main obstacles: the “management” and “people” issues. It has been observed in the field of change management that a good plan and a good methodology are not enough to achieve success; in fact, some studies (Mourier & Smith, 2001) have reported evidence of the importance of involving the stakeholders and managing actively the human aspects throughout the implementation process.

2.17 Summary of Extant Literature

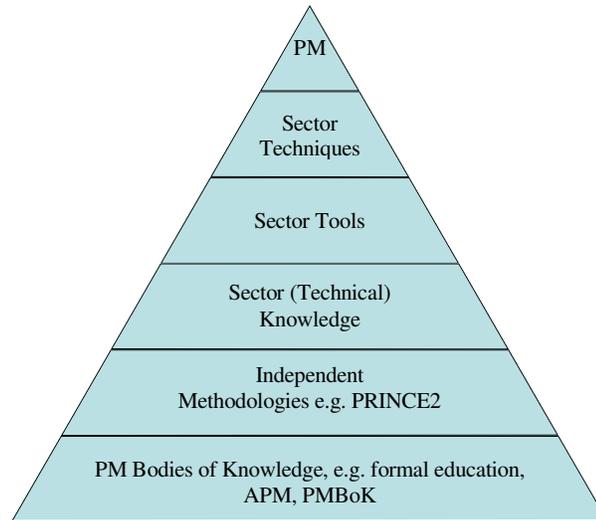
Primarily, the extant literature focuses on the technical and methodological aspects of project management. However, there is a growing awareness of the necessity for PMs to possess and develop the softer inter-personal skills, particularly in relation to the management of stakeholders and their expectations; “it’s all about the people”

(Thomas & Buckle-Henning 2007, p.555). There appears to be very little in the way of discussion about PMs being able to transfer PM knowledge from one sector with which they are familiar, to another in which they have little or no familiarity or technical expertise. Therefore, the growing interest in the softer skills required by PMs and the knowledge base they would need to acquire and draw upon, are points of interest (Muzio et al. 2007, p.31). As the extant literature appears to have little discussion on the transferable nature of project management knowledge and the ability of practitioners to transfer this knowledge from one sector to another, there is an established need to add to the project management body of knowledge by conducting further research into this potentially beneficial area.

2.18 Hypothetic Model

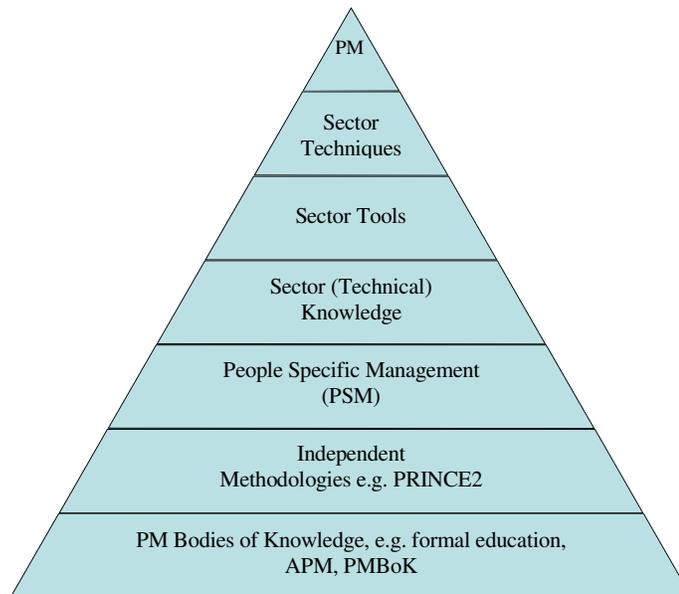
Assessment, in terms of the current hypothetical model in PM literature, suggests that the current PM body of knowledge has a primary focus on the technical and methodological aspects as can be seen in the base of Figure 3 below. The model is derived from extant literature and discussions with the focus group initiated for this research (discussed in Chapter 3). The base two levels of the model relate largely to the PRINCE2 and PMBOK[®] knowledge areas and processes, used widely in education programs and by practitioners. The combining of the Project Management Institute (2000) and the Office of Government Commerce (2003) guidelines for project management formed the basis of the structure of the model, as the nine knowledge areas contained within the Project Management Institute's PMBOK[®] provide a widely accepted basis on which to conduct PM (Gray & Larson 2006; Mantel Jr et al. 2001; Nokes & Kelly 2007; Pinto 2007). This, followed by the Office of Government Commerce (2003) PRINCE2 methodology, broadly supported (Barker & Cole 2007; Parker & Craig 2008; Yeates & Cadle 1996) and growing in acceptance within the Australian workplace (particularly within government agencies) forms the progression from acquiring a knowledge base to requiring or preferring to work within a methodology framework. The subsequent levels in the model, relating to sector specifics, follow the earlier discussion regarding the selection of a PM.

Figure 3
Current PM Model Derived from Extant Literature



However, there is a growing awareness of the need to address the relationship aspects of managing stakeholders, use of the ‘people skills’ (Barker & Cole 2007; Parker & Craig 2008) and the knowledge base required for these aspects of the management of projects. Time and again, PM’s discussions stress the importance of communication and involving and informing all concerned in a particular project or program. A suggested revised model with the inclusion of ‘People Specific Management’ (PSM) is shown in Figure 4 below. In relating the hypothetical model as determined from extant literature to the hypotheses in this research, it was considered necessary to ‘explore’ further by engaging with PMs to ascertain what knowledge areas they are currently utilising in different sectors. As a further result of the literature review, a focus of such engagement includes the utilisation of the softer knowledge areas and any generic or sector specific aspects of their use.

Figure 4
Revised Hypothetical PM Model



As shown above, the inclusion of the PSM level in the revised hypothetical model from extant literature increasingly is seen as a necessary factor in the management of projects. For the purposes of later reference to levels in the above models, it is stated that the base of the pyramid is level 1 and the top of the pyramid, in the case of the revised model, is Level 7 (see Table 10).

2.18.1 Hypotheses

The current research project can be described by the use of four hypotheses developed from the sub questions in Chapter 1. Hypothesis 1 relates to the revised hypothetical model (Figure 4, Level 1), as the PM bodies of knowledge referred to in the model are found to contribute consistently to the basis of both vocational and tertiary education and training. Hypothesis 2 relates to the model, as independent methodologies (e.g., PRINCE2) are provided to practitioners (often by employers) via accredited trainers, across differing sectors. Hypothesis 3 is included to contribute to the examination and relationship of Hypotheses 1 and 2 to the revised hypothetical model (Figure 4). Hypothesis 4 contributes to the examination of the revised hypothetical model, by providing a focus on the consistency of practitioners' use of the PM knowledge areas, suggested at Levels 1 and 2.

Hypothesis 1

Ho1: Project management can be considered a discipline that facilitates individual practitioners applying their knowledge across different sectors.

HA1: Project management can be considered a discipline that restricts individual practitioners from applying their knowledge across different sectors.

Hypothesis 2

Ho2: Project managers in differing sectors can be considered to utilise common knowledge areas.

HA2: Project managers in differing sectors can be considered to utilise uncommon knowledge areas.

Hypothesis 3

Ho3: Project managers can be considered able to utilise knowledge from one sector in a different sector.

HA3: Project managers can be considered unable to utilise knowledge from one sector in a different sector.

Hypothesis 4

Ho4: Project managers can be considered able to apply a larger amount of knowledge from managing projects in one sector (in which they are familiar), to another sector (in which they are unfamiliar).

HA4: Project managers can be considered only able to apply a limited amount of knowledge from managing projects in one sector (in which they are familiar), to another sector (in which they are unfamiliar).

2.19 Conclusion

Hyari (2006, p.40), in her research into project success, suggests that “in particular, further studies into the situation of specific knowledge and information management may open one potential avenue to increase effective communication that was found critical in most project management phases”. Snider and Nissen (2003, p.11) as well as

Horner Reich and Yong Wee (2006, p.22) and Anderson and Muller (2007, p.85) highlight the need for a greater understanding and focus on project management knowledge and in terms of the current research, the understanding of said knowledge may be of benefit to the project manager seeking to transfer from one familiar sector context to one that is unfamiliar.

However, when projects rely on innovation and organizational transformation for their success, all sources of expertise need to be identified, sourced and utilized. The addition of a knowledge management perspective to the PMBOK® Guide may well achieve this goal and help to improve project success rates.

This research has been undertaken to analyse extant literature and produce a framework of the extent to which current theory and practice reflects the project manager's capability to transfer PM knowledge from one familiar sector to an unfamiliar sector and still be able to operate effectively. The framework has been achieved by comparing various authors' discussions on knowledge, its transferability and the current use of methodologies and frameworks in project management practice. The continuing evolution of project management as a field of practice warrants, in the researcher's opinion, further study into what knowledge areas will enable a PM to transfer effectively across different sectors.

Because there is little research on whether or not a project manager trained in and familiar with one sector is able to utilize the PM knowledge gained in the original sector in order to transfer and operate effectively in an unfamiliar sector, it is critical to determine the importance of the knowledge areas employed by project managers in various sectors and whether these are, in fact, specific or generic skills. In conclusion, the research review reveals that there is a gap in the extant literature on the nature of project management knowledge and its transferability.

Due to the difficulty in discovering extant literature on the identified problems, project managers may face transferring their PM knowledge from one sector to another and, indeed, the difficulty in clarifying the distinction between the transferring of knowledge and the application of that knowledge in a new sector, the review of literature confirms the need for an in-depth study to add to the project management body of knowledge.

CHAPTER 3: METHODOLOGY

3.0 Overview

Chapters One and Two have been used to outline the basis and background of the current research project, the purpose of which is to understand the potential, or otherwise, of project managers to transfer their knowledge base successfully between different business sectors. As demonstrated in the literature review, project management is a widely used process with practitioners having quite different opinions as to what knowledge is required of a project manager; opinions vary also as to the level of knowledge required. The current chapter addresses and explains important aspects of the actual research, including the research approach, the sampling strategy, data collection and data analysis.

By means of the research, it was sought to identify the PM knowledge areas utilised by project managers in different business sectors and disciplines; the goal being to determine whether there are common, as well as distinct, knowledge areas that are allied to certain aspects of the PM role. Koskinen's (2004, p.14) view is that "the managerial practices employed in a project have to match the specific nature of knowledge"; therefore, he discusses the fact that it is necessary not only to identify the knowledge characteristics, but understand them. It was in seeking to understand the generic and specific knowledge areas utilised by project managers in various business sectors that the current research could be used to increase the overall knowledge for project management practitioners. It was envisaged that the answers to the research questions would lead to a clarification of project management knowledge areas particular to a sector, as well as areas more generic in nature. Thus, it is anticipated that research findings will assist in better equipping project managers in undertaking their projects, *and* for transferring their PM knowledge across different business sectors/disciplines.

When initiating the current research, a range of research methods and approaches was considered, including:

- Descriptive research; undertaken to ascertain and describe the characteristics of particular variables that may be of interest in a given situation. Frequently descriptive studies are undertaken in organisations in order to learn about and describe the characteristics of a group of employees. The goal of a descriptive study, therefore, is to offer a profile or to describe relevant aspects of the phenomenon of interest (Cavana, Delahaye & Sekaran 2001, p.109)
- Exploratory research; three interrelated purposes for exploratory research exist - diagnosing the situation, screening alternatives and discovering new ideas (Zikmund 1997, p.103);
- Causal research; generally undertaken to identify cause and effect relationships between variables, often with a predetermined expectation of a relationship (Kotler 2000, p.106; Zikmund 1997, p.39).
- Case studies; whereby the researcher undertakes a systematic approach in gathering information on a single entity e.g. an organisation, community, group or individual, to investigate a situation similar to the researcher's problem (Cavana, Delahaye & Sekaran 2001, p.112; Zikmund 1997, p.107)..

As there is little extant literature about PMs being able to transfer their PM knowledge from one professional discipline to another, what knowledge areas they use and to what degree, it was determined that exploratory research was appropriate to initiate the project due to the diagnostic nature of such research, as recommended by Zikmund (Zikmund 1997, pp.103-125).

Consequently, the research sequence began with the development of a focus group to assist in the first stage of exploratory research. The focus group interview, described by Zikmund (1997, p. 109) as “an unstructured, free-flowing interview with a small group of people” was used to develop a preliminary diagnosis of the dissertation topic. Furthermore, Cavana, Delahaye and Sekaran (2001, p.108) have suggested “an exploratory study is undertaken when little is known about the situation at hand, or no

information is available on how similar problems or research issues have been resolved in the past”. Therefore, it was considered worthwhile to use a focus group of project managers drawn from the Australian Institute of Project Management (AIPM) Registered Project Manager program (RegPM). The group consisted of ten PMs who were in the process of undertaking assessment in the AIPM’s program for PM professional recognition. As they were practicing PMs and were required to gather evidence on the role as part of their assessment, they were ‘open’ to participation and the completion of a trial questionnaire and subsequent discussion on possible adjustments to the survey instrument. Because this initial stage of the research was inductive in nature, it was anticipated that the use of the group would lead to the clarification of the topic, a more explicit focus on the research issues and develop a link between theory and practice which, arguably, has been lacking in project management literature (Jugdev 2004, p.16). Further, the information generated by the focus group was linked directly to the formulation of research hypotheses and formed a basis on which the structure of an appropriate survey instrument was constructed.

As the research was initiated using the positivist paradigm, which has its roots in the natural sciences and uses a linear strategy for forming hypotheses and then attempting to disprove them (Cavana, Delahaye & Sekaran 2001, p.8), the focus group provided a practical ‘experience survey’ of the topic; i.e., an exploratory research technique in which individuals who are knowledgeable about a particular research problem are surveyed (Zikmund 1997, p.106). The group focussed on available PM concepts and considered the possibility and relevance of a questionnaire consisting of a ‘blend’ of what constitutes the two pre-eminent knowledge bases in project management; namely, those bases propertied by The Project Management Institute (USA) and the Office of Government Commerce (UK); i.e. Levels 1 and 2 in the hypothetical model shown in Figure 3. It was considered by the group to be of value to ‘blend’ the knowledge bases, as they are both project management focussed, but with differing perspectives.

In his paper comparing PRINCE2 with PMBOK[®], Wideman ((2002) discusses the view that one (*viz.*, PMBOK[®]) is viewed from the project owners’ perspective and the other (*viz.*, PRINCE2) assumes that the project is being managed by the supplier.

Therefore, it appeared logical to examine whether or not the two could be combined, at least at a basic level. Not only was the concept behind the blending to seek to ascertain the broad range of knowledge areas being utilised by project managers but, as well, to encourage the focus group to consider the fundamental question of ‘transferability’ of PM knowledge. The possibility of a combined model that could be expanded to suggest a more comprehensive and relevant model raised the opportunity for the focus group members to establish a neutral, creative knowledge base; i.e., one with no established proprietary interest.

The second stage of exploratory research, *viz.*, screening alternatives, was interpreted as requiring a substantial collection of relevant data on the research topic from practising PMs. This required the development and distribution of a blended questionnaire. Due to the sheer size (2,525,500 square kilometres) and geographical nature of Western Australia and the distribution of PMs throughout the State, a survey was the only practical solution within time and budgetary constraints to collect the relevant data. The survey instrument, in addition to containing an amalgamation of the extant knowledge bases, focused on the research epistemology and included an open question seeking to ascertain whether there were any PM knowledge areas currently in use by the project managers in their different discipline sectors (Zikmund 1997, p.380) that were not identified in current theories. The results from a range of concepts raised by the focus group, provided a closer alignment of the research topic to the questionnaire to be used with research participants; this alignment met the research requirements identified by Cavana, Delahaye and Sekaran (2001, p.154) and allowed for its broad distribution to the project management community. The results from the broader survey were considered to be likely to contribute to the concept of whether or not a project manager is able to transfer their PM knowledge base across professional disciplines. Zikmund (1997, p.22) describes such a concept as a theory; outcomes from the responses to the research instrument were anticipated to provide “a coherent set of general propositions used to explain the apparent relationships among certain observed phenomena”.

The third stage of exploratory research is to discover new ideas. Thus, as the research was considered to be in the positivist paradigm, the following extract from Cavana, Delahaye and Sekaran (2001, p.8) outlines the logic and framework chosen for

structuring the current research project and emphasises the focus of objectivity during analysis.

Positivist research uses deductive reasoning – beginning with a theoretical position and moving towards concrete empirical evidence – to identify a set of universal laws that can be used to predict general systems of human activity. Accordingly, positivist research is based on the assumption that there is a set of universal laws out there waiting to be discovered. The positivist researcher is expected to remain aloof and separate from the research subjects to ensure total objectivity during data gathering and analysis.

The exploratory research was built on the concept of utilising the positivist paradigm. Initially, the survey was used to identify the PMs' skills areas and determine whether or not project managers are able to transfer their knowledge base across professional disciplines. The questionnaire consisted of a numerical rating (Likert scale) applied to the respondents' indications of the knowledge areas currently being utilised in their role as a project manager, in their particular sector. This resulted in a grading that was used to ascertain whether there was a consistent application of criteria across professional disciplines. The testing of the questionnaire was conducted by its use in 'first pass' (utilising the questionnaire to allow the PMs to self assess as to their current level against the AIPM standards) assessment of project managers recognised by the AIPM.

The project managers' responses to the questions, in relation to the use of project management knowledge areas and their experience of the application of those areas within their professional discipline, allowed comparison of the performance of project managers in different disciplines. The researcher acknowledges that the project managers who responded are likely to be positively disposed to the overall topic.

However, as a 'practising' project manager, the researcher is in a unique position to conduct the research in a nomothetic vein; i.e., looking for emergent patterns and evaluating/confirming the research outcomes. It is considered the current knowledge base on project management will benefit from the discovery process of the approach chosen. Rather than using scientific observation, the choice of survey research was preferred because the option of interviewing and/or recording the behavioural patterns

of project managers, due to the sheer size (2,525,500 square kilometres) of Western Australia was not a viable option.

Project managers were chosen based on their role; i.e., that they were within the same professional disciplines as identified by the focus group. Respondents were required to be at project manager level as depicted in the professional discipline in question. The respondents were asked to rate themselves as to their understanding and use of the project management knowledge areas as detailed in the questionnaire and related to Levels 1 and 2 of Figure 3; they were required to report on what they considered to be their strengths and weaknesses in project management. A further question sought to ascertain whether the respondents, had transferred from their original occupation/profession to a different discipline and whether they perceived their results to be comparable.

Finally, it was envisaged that, due to the idiographic aspects of the research, the results may indicate a number of areas where the project management profession could assist its practitioners. This might be facilitated by conducting workshops ‘on site’ and demonstrating the application of the project management knowledge areas proposed in the questionnaire to employees and to senior managers. A result of the different professional disciplines being researched may give an indication of cross-fertilisation between project managers who have the technical credibility to operate across a wide variety of disciplines and, possibly, industries.

3.1 Approach

The concept of aligning the approach of the study to the selected research methodology was considered in light of ascertaining whether the PM knowledge gained by means of experience in ‘just doing’ without any formal structure in place, would be more transferable, say, than knowledge gained by prescribed training and qualification in the area.

3.2 Research Design

Primarily, the research methodology chosen as applicable for the current research project was quantitative. Van Donk and Riezebos argue (2005, p.79) that “in order to explore this inventory, we first have to identify the set of employees, project phases

and markets, and specify what knowledge we want to measure. Next, measurement should take place and, finally, reports should be generated”.

Therefore, in specifying the set of employees (project managers) whose knowledge inventory had to be explored, and in defining the knowledge areas that had to be distinguished, the next stage measured the actual knowledge inventory. The task consisted of three phases: selecting the measurement scales, performing the measurements and validating the data. The final stage reports on the knowledge inventory of the project managers along the lines of the Resource-Based View (RBV) in the strategy literature (Jugdev 2004, P.19); viz., knowledge, skills, know-how and its use, with the focus in the knowledge areas distinctly specific to a particular sector and those areas generic enough to be applicable across different sectors. Reports, then, were generated on knowledge area items at an aggregate level. Item level reports provided information on the elements of the range specification; i.e., a report on the specific knowledge inventory used by project managers in different industry sectors/disciplines. A further example is a report on the knowledge inventory in a specific sector, with details on the type of knowledge held by the project managers and the sector where this knowledge was gained and/or utilised. Aggregate level reports provide information on a higher level; they abstract from differences within the sets of project managers and sectors, and generalise the knowledge inventory. Both reports have value for the management of a project-based organisation.

The existing body of knowledge related to project management will be enhanced by the collection of detailed data that will lead to information on the involvement and knowledge of PMs in different sectors and markets; therefore, it may be possible to broaden the scope of the project managers’ activities. This would assist them in exploring new markets, provide a basis for training ‘upcoming’ PMs by investing in new personnel and contribute to curriculum development in training programs.

3.3 Sampling Method

As the research is concerned not only with seeking to ascertain the existing knowledge basis about project management, but also improving it by ‘cross-fertilisation’, the major questionnaire was sent to project managers operating in different sectors and was self- administered as recommended by Mullanly (2006, p.63). The target number

across the different sectors was for a sample of 300 project managers located primarily within Western Australia, with the questionnaire being sent via e-mail and accompanied by a covering letter. The returning of the questionnaire via e-mail allowed for the data gathering to be automated. The cover letter asked the recipients to confirm both their willingness to participate freely in the survey and that they were indeed a project manager operating in the particular sector. A follow-up e-mail was sent to all initial recipients no later than four weeks after the initial mailing. The purpose of the follow-up was to increase the percentage of completed, returned questionnaires. The final questionnaire consisted of a 'blending' of the Project Management Institute USA and the Office of Government Commerce UK knowledge areas, together with ideas gleaned from the focus group; it comprised a series of closed questions with a range of available responses, together with a number of open-ended questions that allowed respondents to add any knowledge areas currently being used but which may have been omitted from the earlier questions.

The use of the self administered questionnaire, whilst reducing any potential bias on behalf of the interviewer and/or the respondent, does introduce the possibility of a low response rate. However, the email method does allow a busy project manager the option of completing the responses within his/her own schedule.

3.4 Selection of Subjects

The research was initiated by use of a focus group derived from senior members of the Australian Institute of Project Management (AIPM). Zikmund (1997, p.110) argues that "the primary advantage of focus group interviews are that they are relatively brief, easy to execute, quickly analysed, and inexpensive". Thus, in the beginning of the research process, the decision was made to solicit responses from members of the AIPM as the pre-eminent professional body for project management within Australia. The members formed the focus group and results from its deliberations were used to validate the questionnaire prior to final distribution.

3.5 Instrumentation

Table 4 below, is extracted from a conference paper by Siegelaub (2004, p.2) who discusses the strengths of the PRINCE2 methodology and how it complements the PMBOK® Guide, and the possible benefits to be derived by the combination of the two practices.

Table 4
PMBOK® and PRINCE2

PMBOK® Knowledge Areas	PRINCE 2 Comparable Components
Integration	Combined processes and components of change control
Scope, Time, Cost	Plans and Business Case
Quality	Quality, Configuration Management
Risk	Risk
Communications	Controls
Human Resources	Organisation (Limited)
Procurement	Not covered

Source: Adapted from Siegelaub (2004, p.2)

Furthermore, Siegelaub (2004, P.7) recommends the integration of the two practices; “Get to know PRINCE2 and consider using it as the core of your company’s project management approach – perhaps along the lines of PMBOK® Guide and PRINCE2 – together”.

The combining of the Project Management Institute (2000) and the Office of Government Commerce (2003) guidelines for project management formed the basis of the structure for discussion with the focus group. Subsequently, the results of the discussions, in terms of the project managers’ experiences were included in the initial survey instrument. The instrument, then, was tested further for validity on ten volunteer project managers who were members of the Western Australian Chapter of the AIPM.

Final adjustments were made to the instrument based on the results of the tests; e.g., it was determined to ask respondents to respond to the ‘blended’ knowledge areas using

a Likert scale; *viz.*, 1 = never used, 2 = rarely used, 3 = occasionally used, 4 = often used, 5 = constantly used.

3.6 Ethical Considerations

To ensure proper procedures in the conduct of the research, and to enable the protection of participants' identities, those participating in the research could choose to use a generic email address from their organisational or personal address, and without exception that was de-identified upon receipt by the researcher. Thus, research participants are not identified, and cannot be, even in the original responses. Aggregate data, not responses of specific individuals, was important to the research so participants were not identified in the current research data, nor will be in any subsequent publications. In addition, company details were removed from the responses, along with any other recognisable identifiers. E-mail submissions were 'burnt' to disc and are kept in a locked cabinet. All original e-mails were deleted from the research's personal laptop computer; a computer of which he is the sole user. All data from the current research is being stored in the Curtin Business School Higher Degree by Research area for a minimum of five years consistent with the joint NRC/AVCC statement and guidelines on research practice and will be destroyed after that time.

As email was the means used to collect and collate the data and no personal information was sought or collected, the above process was considered to be sufficient to meet the rigorous ethical considerations required of researchers. Especially this was the case because participants were free to respond, or not, to the questionnaire, and they were advised that they were able to withdraw from the research at any stage without penalty.

In effect, to ensure the protection of the rights of the research participants, the research was approved and conducted in accordance with the Curtin Business School, Curtin University of Technology's Code of Conduct for the Responsible Practice of Research, <http://www.curtin.edu.au/>.

Finally, it should be noted that all research participants had the right to complete the questionnaire in full or in part. Further, to the researcher's knowledge, no participant

experienced any discomfort or distress due to their involvement in the research process.

3.7 Data Collection and Recording

Data were collected by means of the structured survey instrument containing the variables of interest. Data collection and recording was achieved via the use of e-mail. The use of e-mail was considered not only to be appropriate, but preferred, due to the geographical dispersion of respondents throughout Western Australia. Also, use of the email enabled ready tabulation of the respondents' completed questionnaires and the subsequent analysis utilising the SPSS software package. The benefits of electronic mail for research projects such as this are many; practical (geographic issues), time, cost (stationery and postage), management of data and participation (minimum effort required) benefits were noted.

3.8 Data Analysis

Once the final survey results were received, the data was aggregated by use of the SPSS software program and following the suggested analysis components contained within the 2006 software.

3.9 Methodological Assumptions

In the current research, the process of the literature review revealed that little was known on the subject of project managers transferring PM knowledge across different business sectors. Once the gap in the literature was identified and confirmed, the researcher's own experience and the experience of practising project managers acting in the focus group was used to provide refinement of the study, its methodology and the development of the research instrument.

3.10 Weaknesses

As the basis of the survey, the combination of the Project Management Institute USA and the Office of Government Commerce UK knowledge areas may have unintentionally excluded relevant knowledge areas upon which the project managers could comment. The use of open-ended questions was used to offset this potential weakness.

3.11 Summary

Continuing on from the development of the literature review which identified gaps in the theory and practice of project management, Chapter 3 has been used to detail the methodology underlying the study. Starting with a description of the overall approach to the current research, the research design is discussed in operational terms and indicates strategies used in sampling, instrumentation development and data collecting/processing/analysis. In addition, there was discussion of the logic of initiating the research with a focus group as a precursor to the development of the survey instrument to allow use of a quantitative approach.

The next chapter is used to present both the analysis of the collected data and an interpretive evaluation of the results.

CHAPTER 4: RESULTS AND ANALYSIS

4.0 Overview

The fourth chapter is used to outline and discuss the results of the information collected in the survey process. The hypotheses are tested through statistical analysis and discussed as to possible implications and conclusions. As demonstrated in the literature review, project management is an increasingly widely-used practice, often with quite different opinions as to what knowledge is required of a project manager; these findings add to the current understanding of what constitutes project management and its recognised body of knowledge.

The research questionnaire was completed and returned by 61 respondents; a return rate of 20.3%. The fact that respondents represented a broad range of industry sectors, qualifications and value of projects managed (See Tables 7 and 9 and Appendix 2); gave the researcher confidence that the results are not idiosyncratic or unrepresentative of Western Australian project managers in general. Each respondent completed all parts of the survey with no omissions or errors. Consequently, it is anticipated that the research findings will assist in better equipping project managers in undertaking their projects, *and* for transferring their knowledge across different business sectors/disciplines.

4.1 *Descriptive Statistics*

4.1.1 *Age of Project Managers*

Table 5, below, demonstrates the age range of the respondents participating in the research; the youngest was 29 years and the oldest 64 years with the largest percentage of respondents (65.6%) indicated in the 40-54 years of age. This corresponds with the researcher's discussions within project management professional 'circles' regarding the increasing age of practising project managers. The need to prepare for their retirement is a personal concern, though a related issue is the subsequent loss of the knowledge and skills of mature PMs. Furthermore, the lowest range of ages, i.e., 'Under 30' corresponds with the limited general introduction of aspiring project managers to project management. Because PMs have originated from a particular trade, profession or discipline, it is the researcher's opinion that, during the ages of 20-29 years, future project managers are acquiring their basic education, qualifications

and experience in various sectors. Subsequent to a successful career in a particular discipline, individuals gain an interest in, or are directed towards, project management. Arguably, as can be seen in Table 5 below, it is the early 30s when people begin to actively practice project management.

Table 5
Age Distribution in Research

Range	Frequency	Percentage	Cumulative %
Under 30	1	1.6	1.6
30 - 34	4	6.6	8.2
35 - 39	7	11.5	19.7
40 - 44	13	21.3	41
45 - 49	14	23	64
50 - 54	13	21.3	85.3
55 - 59	7	11.5	96.8
60 +	2	3.2	100

Thus, it may be argued that there is a more consistent influx into project management from people after reaching 35 years of age. The age range of respondents between the ages of 40 and 54 suggests that once people decide on project management it becomes their career of choice. The reduction in the number of respondents from the age of 55 onwards reflects the early retirement age in Australia and, of course, from 60+, one would expect to see a major decline in the number of PMs.

4.1.2 Gender

The gender of participants can be seen in the following Table 6. With the total of 61 participants comprised of seven females and fifty four males, the bias of males to females is evident; a typical point of discussion at ‘gatherings’ of PMs. Again, the point is brought to the reader’s attention not only as a matter of possible interest, but as an issue within PM and its component disciplines.

Table 6
Gender Participation in Research

	Frequency	Percent	Cumulative %
Female	7	11.5	11.5
Male	54	88.5	100
Total	61	100.0	

4.1.3 Formal Educational Qualifications in PM

The distribution of the participants in respect to whether or not they had formal PM training and qualifications is demonstrated in the following Table 7. The term ‘formal’ has been interpreted as the participants undertaking tertiary or similar education and training courses. It is worthy of note, that not one respondent indicated having undertaken an undergraduate degree in project management! In the researcher's opinion, this is due to the lack of PM undergraduate degrees which has occurred as a result of project management being a discipline that becomes attractive to individuals only after they have gained experience, education and qualifications in an initial discipline or profession. Thus, it is acknowledged that the provision of project management education in tertiary institutions is conducted primarily at the postgraduate level.

It is evident that 26 PMs (42.6% of participants) had either no PM or only informal PM qualifications; this is a major issue for potential employers and professional accreditation organisations and one that would be unacceptable in most professions. The Diploma and Advanced Diploma, as discussed previously (see Table 3), relate to the levels 5 and 6 of the Australian Standards Framework (ASF) and are aligned to the Australian Qualifications Framework (AQF); and, further, to the AIPM's Registered Project Manager program. These awards are obtained from either the professional body in Australia (AIPM) and or via undertaking short-course study at either Registered Training Organisations (RTOs) or TAFE Colleges. Further analysis was conducted using non-parametric testing utilising these results and is discussed later in the current chapter.

Table 7
PM Qualifications

	Frequency	Percent	Cumulative %
None	16	26.2	26.2
Informal	10	16.4	42.6
Diploma	18	29.5	72.1
Advanced Diploma	11	18	90.2
Masters Degree	6	9.8	100.0
Total	61	100.0	

4.1.4 Original Occupation and Training

The original occupation and training of the participants is detailed in the following Table 8. Participants were grouped according to their response to the questionnaire; e.g., ‘building and construction’ contains all respondents who indicated sectors such as building maintenance, property services, civil construction and general construction. Worthy of note are the larger groupings from the Engineering, Building and Construction and Technical Services sectors; these results correspond with the historical development of Project Management, as discussed in the earlier chapters.

Table 8
Original Training of PMs

	Frequency	Percent	Cumulative %
Building and Construction	11	18.0	18.0
Defence- Various	5	8.2	26.2
Engineering - Various	22	36.1	62.3
Financial Services	2	3.3	65.6
Healthcare	1	1.6	67.2
Learning	2	3.3	70.5
Technical services	9	14.8	85.2
Trades	6	9.8	95.1
Retail	1	1.6	96.7
Legal	1	1.6	98.4
Services	1	1.6	100.0
Total	61	100	

The Project Management Institute (PMI) contracted a survey (statistics available from membership area on PMI website – www.pmi.org) with regard to the make up of its

membership in August 2005, resulting in the following statistics: 29 percent worked in Information Technology or computer/software/data processing, 13 percent worked in financial services/insurance/real estate, 11 percent worked in consulting or business services, 10 percent worked in telecommunications or utilities, 9 percent worked in government/public administration or aerospace/defence, 7 percent worked in engineering or construction and 7 percent worked in healthcare or pharmaceuticals.

As can be seen from the comparison between the PMI survey in 2005 and the occupation of the respondents in the current research, there are marked differences; in part, this may be due to the respondents in the current research being drawn largely from Western Australia where the main economic driver is the resource sector. In the researcher's opinion, this explains the larger numbers of respondents from both Engineering and Building and Construction.

4.1.5 Largest Size (\$ Value) of Project Managed

When asked to provide the largest project in dollar value that they had managed, participants provided an interesting view of the importance and range of responsibilities undertaken by project managers; moreover, they indicated their wider contribution to commerce, as follows

- The largest project managed by a participant in the survey was AUS \$750 million;
- 6.6% of participants managed projects in excess of AUS \$20 million, and
- 4.9% in excess of AUS \$100 million.

The complete range of dollar value of projects managed by the respondents is to be found in Appendix 2.

When considering the value of the projects managed by at least some of the respondents, the suggestion is that employers need to make very careful and considered decisions when employing project managers. In making these decisions, the revised model in Figure 4 would provide a broad basis to ascertain whether the project manager in question possesses the underlying knowledge and training to provide confidence to the prospective employer.

The results in Table 7 regarding qualifications demonstrate the increased importance of the above, in the light of the figures, e.g., no/informal qualifications indicated by 42.6% of the respondents. This poses consideration for future research into the relationship between project managers undertaking extremely large value projects and their training/qualifications in project management. An area of possible interest is whether or not, as an example, the resource sector (known for large value projects) has a focus on the potential project manager’s skills in project management or a focus on the particular technical knowledge of the sector. In fact, if the focus is on the technical knowledge of the sector, this may limit the PMs ability to transfer across or within sectors and, therefore, their usefulness to the employer.

4.1.6 Current Industry or Business Sector

The following Table 9 groups participants based on the responses given in the questionnaire in terms of the PMs current industry or business sector; e.g., the ‘consulting various’ group consists of participants providing services to sectors including defence, government, financial services and engineering. Again, the larger representation of the ‘technical’ fields, such as Resource Sector, Building and Construction and Consulting Various, corresponds with the historical development of project management as discussed in the earlier chapters.

**Table 9
Current Industry Category**

	Frequency	Percent	Cumulative %
Building and Construction	11	18.0	18.0
Consulting Various	9	14.8	32.8
Defence- Various	8	13.1	45.9
Engineering - Various	6	9.8	55.7
Financial Services	3	4.9	60.7
Government	5	8.2	68.9
Learning	2	3.3	72.1
Resource Sector	12	19.7	91.8
Technical Services	5	8.2	100.0
Total		100.0	

4.2 Data Comparison to Hypothetical Models

For ease of reference, the following Table 10 has been included in the current chapter; it represents the levels within the hypothetical model from extant literature (Figure 3) and the revised hypothetical model (Figure 4). Utilising the levels indicated within Table 10, the researcher will discuss and analyse results obtained from the research questionnaire, and based on the hypothetical models will determine if a relationship exists with the models, and whether or not the models are in fact a reflection of the current practice of project management.

Table 10
Existing and Revised Hypothetical Models

Level	Current Tools, Technical and Technique PM Model (Figure 3)	Revised Hypothetical PM Model (Figure 4)
7		PM
6	PM	Sector Techniques
5	Sector Techniques	Sector Tools
4	Sector Tools	Sector (Technical) Knowledge
3	Sector (Technical) Knowledge	People Specific Management (PSM)
2	Independent Methodologies, e.g., PRINCE2	Independent Methodologies, e.g., PRINCE2
1	PM Bodies of Knowledge, e.g., formal education, APM, PMBOK®	PM Bodies of Knowledge, e.g., formal education, APM, PMBOK®

4.2.1 Hypothetical Model – Level 1

In examining the data in relation to Level 1, nine tables are presented to demonstrate the respondents' indication of their use of the nine knowledge areas propertied by the Project Management Institute (2004) as included in the questionnaire (Appendix 3). The respondents indicated their use of each knowledge area by responding on a Likert scale score; *viz.*, 1 = never used, 2 = rarely used, 3 = occasionally used, 4 = often used, 5 = constantly used.

4.2.1.1 *Integration Management*

Table 11 represents the outline of the ratings of the respondents, against the ten questions contained within the Integration Management section of the questionnaire.

Table 11
Integration Management

	N	Minimum	Maximum	Mean	Std. Dev.
Integration Management	61	1	5	4.25	.79

As can be observed from the results in Table 11, the respondents clearly indicate a high use of the performance criteria contained within Integration Management. The responses may be an indication, as can be seen in Table 5 earlier in this chapter, of the general maturity of the respondents. Also, it is likely to be due, in part, to the emphasis placed on Integration Management in their respective accredited training programs and awards. The emphasis is placed in training by both the Project Management Institute (2004) and the Australian Institute of Project Management (2006b). However, given the numbers of PMs with 'no' or 'informal' training qualifications, it is suggested that Integration Management concepts are part of a PMs usual experience and practice. The results suggest Level 1 within the hypothetical model in Figure 3 reflects not only what is discussed in literature, but also what is being utilised by practitioners.

4.2.1.2 *Scope Management*

Table 12 represents the outline of the ratings of the respondents in relation to the seven questions contained within the Scope Management section of the questionnaire.

Table 12
Scope Management

	N	Minimum	Maximum	Mean	Std. Dev.
Scope Management	61	1	5	4.23	.70

From the results in Table 12, it is observed that the respondents clearly indicate their use of the performance criteria contained within Scope Management. Again, this may

be indicative of the maturity of the respondents in general. The mean score is lower than that of Integrated Management, although the standard deviation of scores is similar. Thus, the results suggest, again, that Level 1 within the hypothetical model in Figure 3 reflects what is discussed in literature, used in training programmes and is being utilised by practitioners.

4.2.1.3 Time Management

Table 13 represents the outline of the ratings of the respondents for the nine questions contained within the Time Management section of the questionnaire.

**Table 13
Time Management**

	N	Minimum	Maximum	Mean	Std. Dev.
Time Management	61	1	5	4.21	.70

The results in Table 13 indicate that respondents have a high degree of use of the performance criteria contained within Time Management. The mean score of responses is lower than in previous categories; however, the standard deviation remains similar. Thus, the researcher's conclusions remain closely allied to the results of the first two management categories and confirm the value of the time management knowledge areas identified in Level 1.

4.2.1.4 Cost Management

Table 14 represents the outline of the ratings of the respondents regarding the nine questions contained within the Cost Management section of the questionnaire.

**Table 14
Cost Management**

	N	Minimum	Maximum	Mean	Std. Dev.
Cost Management	61	1	5	4.05	.88

From the results in Table 14, it is evident that the respondents clearly indicate a high use of the performance criteria contained within Cost Management; however, the mean score is lower than earlier management categories and the standard deviation is higher, indicating a greater variability among the response scores. Nevertheless, the inclusion of Cost Management in Level 1 of the hypothetical model in Figure 3 is warranted.

4.2.1.5 Quality Management

Table 15 represents the outline of the ratings of the respondents, against the eleven questions contained within the Quality Management section of the questionnaire. It is noted from the results in Table 15 that respondents clearly indicate a high use of performance criteria contained within Quality Management. Although the standard deviation among scores is quite varied, the inclusion of Quality Management in Level 1 of the hypothetical model in Figure 3 is warranted.

**Table 15
Quality Management**

	N	Minimum	Maximum	Mean	Std. Dev.
Quality Management	61	1	5	4.08	.84

4.2.1.6 Resource Management

Table 16 represents the outline of the ratings of the respondents in relation to the eleven questions contained within the Resource Management section of the questionnaire. It is noted that this is the first category of management in which a respondent has NOT used the minimum rating of 1 = never used. The mean indicates a high use of Resource Management criteria and a lower standard deviation indicates a higher degree of consensus among PMs than was the case in Quality Management criteria.

**Table 16
Resource Management**

	N	Minimum	Maximum	Mean	Std. Dev.
Resource Management	61	2	5	4.07	.78

As with other areas of management, the results confirm the value of the Resource Management criteria in Level 1 of the hypothetical model in Figure 3.

4.2.1.7 Communication Management

Table 17 represents the outline of the ratings of the respondents in the case of the eight questions contained within the Communication Management section of the questionnaire.

From the results in Table 17, the respondents clearly indicate a high use of the performance criteria contained within Communication Management; although, the responses do range from the minimum to the maximum scores. The standard deviation is close to that of other management categories, so it is possible to validate the inclusion of Communication Management in Level 1 within the hypothetical model in Figure 3.

**Table 17
Communication Management**

	N	Minimum	Maximum	Mean	Std. Dev.
Communication Management	61	1	5	4.11	.78

4.2.1.8 Risk Management

Table 18 represents the outline of the ratings of the respondents in relation to the eight questions contained within the Risk Management section of the questionnaire.

**Table 18
Risk Management**

	N	Minimum	Maximum	Mean	Std. Dev.
Risk Management	61	1	5	4.26	.79

Again, the results are comparable with other management categories, suggesting that the Risk Management criteria are relevant to other performance criteria contained within Level 1 of the hypothetical model in Figure 3.

4.2.1.9 Procurement Management

Table 19 represents the outline of the ratings of the respondents regarding the fourteen questions contained within the Procurement Management section of the questionnaire.

Table 19
Procurement Management

	N	Minimum	Maximum	Mean	Std. Dev.
Procurement Management	61	1	5	4.06	.82

In the Procurement Management area, respondents clearly indicated a high use of the relevant performance criteria. Response scores ranged from the minimum to the maximum available, and the standard deviation was the third highest among the management categories. Nevertheless, the inclusion of Procurement Management among the nine categories included in Level 1 of the hypothetical model in Figure 3 was considered to be justified.

4.2.1.10 Summary of Level 1

When considering whether to list all the results for each of the different knowledge areas or to list the subtotals, it was felt there was little, if any, statistical significance in the listing of all the sub-questions. The inter-item consistency and reliability were confirmed viz., none of the nine knowledge areas above receiving Cronbach's alpha values less than .6; i.e., lowest value .89 (Cavana, Delahaye & Sekaran 2001, p.324). The following Table 20 summarises the findings across all the nine knowledge areas. When examining the hypothetical model Level 1, it is interesting to note in Table 20 below, the average maximum score across all nine areas as indicated by the respondents is 4.15, with an average minimum score of 1 and an average standard deviation of .78. This suggests that these nine knowledge areas indeed are important and practised on a regular basis and further supports the hypothetical models in Figures 3 and 4. As the focus of this research was PM knowledge and its transferability, further research may be indicated in relation to the average minimum score to explore the relationship of PM training and qualifications. Initial observations can be made via Figures 5, 6, 7, 8 & 10, whereby the relationship between types of PM training and use of PM knowledge areas is discussed and demonstrated.

Table 20
Level 1 Category Results

Category of Management	Average Minimum	Average Maximum	Mean	Std. Dev.
Integration	1	5	4.25	.79
Scope	1	5	4.23	.70
Time	1	5	4.21	.70
Cost	1	5	4.05	.88
Quality	1	5	4.08	.84
Resource	2	5	4.07	.78
Communication	1	5	4.11	.78
Risk	1	5	4.26	.79
Procurement	1	5	4.06	.82
Totals	10	45	37.37	7.08
Average	1	5	4.15	.78

A point of interest for future research: to establish whether those practising project managers with no specific project management training, would rate their use of the knowledge areas ‘on a par’ with those project managers who had undertaken medium or high-level PM training. Section 4.4 below provides a preliminary analysis of types of PM training that assist PMs reach level 7 of the revised hypothetical model.

4.2.2 Hypothetical Model – Level 2

In examining the data in relation to Level 2 of the hypothetical model, each of the following six tables is presented to demonstrate the respondents’ indications of their use of the six knowledge areas encapsulated within the PRINCE2 methodology. Propertyed by the Central Computer and Communications Agency (1999), these six areas were included in the questionnaire (Appendix 3). Respondents indicated the importance of each of the various items by ranking the degree to which they were used in practice. Responses were indicated using a Likert scale; *viz.*, 1 = never used, 2 = rarely used, 3 = occasionally used, 4 = often used, 5 = constantly used.

4.2.2.1 Administration Management

Table 21 represents an overview of the ratings of the respondents in relation to the eight questions contained within the Administration Management section of the questionnaire.

Table 21
Administration Management

	N	Minimum	Maximum	Mean	Std. Dev.
Administration Management	61	1	5	4.15	.91

From the results in Table 21, the respondents clearly indicate a high use of the performance criteria contained within Administration Management. Despite the appearance of the greatest standard deviation recorded to date, an indication of the widest spread of results across the response categories, the inclusion of Administration Management is warranted in Level 2 of the hypothetical model in Figure 3.

4.2.2.2 Assurance Management

Table 22 represents an overview of the ratings of the respondents concerning the twelve questions contained within the Assurance Management section of the questionnaire.

Table 22
Assurance Management

	N	Minimum	Maximum	Mean	Std. Dev.
Assurance Management	61	1	5	4.22	.77

Results in Table 22 indicate that respondents make a high use of the performance criteria contained within Assurance Management; consequently, its inclusion in Level 2 of the hypothetical model in Figure 3 is justified.

4.2.2.3 General Management

Table 23 represents an overview of the ratings of the respondents in relation to the seventeen questions contained within the General Management section of the questionnaire.

**Table 23
General Management**

	N	Minimum	Maximum	Mean	Std. Dev.
General Management	61	1	5	4.17	.74

From the results in Table 23, the research participants indicated their use of the performance criteria contained within General Management, validating its inclusion in Level 2 within the hypothetical model in Figure 3.

4.2.2.4 Client-Side Management

Table 24 represents an overview of the ratings by respondents relative to the thirteen questions contained within the Client-side section of the questionnaire.

**Table 24
Client-side Management**

	N	Minimum	Maximum	Mean	Std. Dev.
Client-side Management	61	1	5	4.15	.79

With results in Table 24 being very close to those related to general management, respondents indicated a strong response to their use of the performance criteria contained within Client-side Management; thus, validating its inclusion in Level 2 within the hypothetical model in Figure 3.

4.2.2.5 Executive Management

Table 25 represents the overview of the ratings of the respondents with regard to the sixteen questions contained within the Executive Management section of the questionnaire.

**Table 25
Executive Management**

	N	Minimum	Maximum	Mean	Std. Dev.
Executive Management	61	1	5	3.67	.96

However, in the case of Executive Management the mean score was lower than in previous categories; i.e., with a score of ‘3 = often used’. In addition, the standard deviation indicated a much wider distribution of scores. Consequently, Executive Management can be included in Level 2 within the hypothetical model in Figure 3. because respondents do use the related performance criteria, although more sparingly than other categories.

4.2.2.6 Supplier-side Management

Table 26 represents an overview of respondent ratings in regard to the fourteen questions contained within the Supplier-side Management section of the questionnaire.

**Table 26
Supplier-side Management**

	N	Minimum	Maximum	Mean	Std. Dev.
Supplier-side Management	61	1	5	3.68	1.02

From the results in Table 26, it is evident that the results in this category have the greatest spread across the available scores; i.e., with a standard deviation of 1.02. In addition, the mean response is in the score of ‘3 = often used’; it is used more often than the Executive Management category, but not as frequently was the case of the first four knowledge areas of PRINCE2. Overall, the inclusion of the performance criteria contained within Supplier-side Management is validated for Level 2 within the hypothetical model in Figure 3.

4.2.2.7 Summary of Level 2

As with the analysis of Level 1, it was felt there was little if any statistical significance in the listing of all the sub-questions. The inter-item consistency and reliability were confirmed viz., none of the six knowledge areas above receiving Cronbach’s alpha values less than .6, i.e. lowest value .93 (Cavana, Delahaye & Sekaran 2001, p.324). The following Table 27 summarises the findings across all the suggested six knowledge areas within the PRINCE2 methodology. When examining the hypothetical model Level 2, it is interesting to note in Table 27 below, the average maximum score across all six areas as indicated by the respondents is 4.01

with an average standard deviation of .86. In terms of the demonstration of the use of the knowledge areas, although the average maximum score is slightly lower and the standard deviation slightly higher than Level 1, the scores are still considered to be significant. This suggests that these six knowledge areas are indeed important and practised on a regular basis and, further, supports the hypothetical models in Figures 3 and 4.

Table 27
Level 2 Category Results

Category of Management	Average Minimum	Average Maximum	Mean	Std. Dev.
Administration	1	5	4.15	.91
Assurance	1	5	4.22	.77
General	1	5	4.17	.74
Client-side	1	5	4.15	.79
Executive	1	5	3.67	.96
Supplier-side	1	5	3.68	1.02
Totals	6	30	24.04	5.19
Average	1	5	4.01	.86

4.2.3 Hypothetical Model – Level 3

In analysing the results for Level 3, as opposed to Levels 1 and 2, it is helpful to take each sub-question within People Specific Management, as contained within the questionnaire.

Table 28, represents the responses to the first sub-question related to Level 3 of the revised hypothetical model (Figure 4); ‘I have identified the culture of the *parent* organisation or client’. A total of 49 (80%) respondents indicated either ‘Often done or currently do’ or ‘Managed across multiple projects’; this suggests sufficient use of the first sub-question for it to be included at Level 3 and supports the inclusion of PSM within the revised model (Figure 4).

Table 28
‘I have identified the culture of the parent organisation or client’

	Frequency	Percent	Cumulative Percent
Never Done	2	3.3	3.3
Done under supervision	1	1.6	4.9
Done without supervision	9	14.8	19.7
Often done or currently do	23	37.7	57.4
Managed across multiple projects	26	42.6	100
Total	61	100	

Table 29, represents the responses to the second sub-question related to Level 3 of the revised hypothetical model (Figure 4); ‘I have attempted to modify/change the culture of the organisation or client’. There is a much greater variance in the responses with regard to this question. However, a total of 48 (78.7%) of respondents indicated either ‘Done without supervision’, ‘Often done or currently do’ or ‘Managed across multiple projects’; this suggests sufficient use of the second sub-question to be included at Level 3 and supports the inclusion of PSM within the revised model (Figure 4).

Table 29
‘I have attempted to modify/change the culture of the organisation or client’

	Frequency	Percent	Cumulative Percent
Never Done	7	11.8	11.8
Done under supervision	6	9.8	21.3
Done without supervision	10	16.4	37.7
Often done or currently do	21	34.4	72.1
Managed across multiple projects	17	27.9	100
Total	61	100	

Table 30 represents the responses to the third sub-question related to Level 3 of the revised hypothetical model (Figure 4); ‘I have promoted active disagreement in the project team’. This question demonstrates the greatest variance in the responses discussed to this point. The number of respondents who indicated ‘Never Done’ when considering the promotion of active disagreement, is a particular point of interest because various authors of project management texts cite this as an important factor in project formation and on-going management. Gray and Larson (2006, p.364) discuss

the view that, to ensure the avoidance of critical mistakes “project managers need to encourage healthy dissent in order to improve problem-solving and innovation”. When discussing the different types of conflict occurring within a project, Pinto (2007, p.200) argues that “conflict actually introduces an element of tension that produces innovation, creativity, and higher productivity”. To conclude the discussion in relation to the question relating to active disagreement, Gray and Larson (2006, p.175) suggest that “conflict can be handled in several ways, but one thing seems sure: conflict avoiders do not make successful project managers”. The current researcher is not suggesting, nor is in a position to suggest, that the respondents who indicated ‘Never Done’ are not successful project managers. However, this is an area worthy of a more in-depth study in the future; it would be interesting, for example, to understand why a significant number of project managers appear to be conflict averse.

Table 30
‘I have promoted active disagreement in the project team’

	Frequency	Percent	Cumulative Percent
Never Done	22	36.1	36.1
Done under supervision	6	9.8	45.9
Done without supervision	11	18.0	63.9
Often done or currently do	15	24.6	88.5
Managed across multiple projects	7	11.5	100
Total	61	100	

Table 31 represents the responses to the fourth sub-question related to Level 3 of the revised hypothetical model (Figure 4); ‘I have intentionally created personal friendships in the project team’. Although the variance here is not as great as that demonstrated in the previous question as shown in Table 30, this question demonstrates a variance worthy of future research, as 14 respondents (23%) have indicated having ‘Never Done’ as opposed to 40 (65.6%) respondents having indicated either, ‘Often Done’ or ‘Currently Do’ or ‘Managed Across Multiple Projects’. Simply, it may be a personal trait of the project managers in question, or a cultural issue within their respective organisations.

Table 31
‘I have intentionally created personal friendships in the project team’

	Frequency	Percent	Cumulative Percent
Never Done	14	23.0	23.0
Done under supervision	2	3.3	26.2
Done without supervision	5	8.2	34.4
Often done or currently do	23	37.7	72.1
Managed across multiple projects	17	27.9	100
Total	61	100	

Table 32 represents the responses to the fifth sub-question related to Level 3 of the revised hypothetical model (Figure 4); ‘I have intentionally created a collective vision for the project team’. A total of 51 (83.6%) of respondents indicated either ‘Often done or currently do’ or ‘Managed across multiple projects’; this suggests sufficient use of the fifth sub-question to be included at Level 3 and supports the inclusion of PSM within the revised model (Figure 4). The notion of creating a project vision is supported by Gray and Larson (2006, p.356); *viz.*, that “a vision inspires members to give their best efforts”.

Table 32
‘I have intentionally created a collective vision for the project team’

	Frequency	Percent	Cumulative Percent
Never Done	2	3.3	3.3
Done under supervision	0		
Done without supervision	8	13.1	16.4
Often done or currently do	26	42.6	59.0
Managed across multiple projects	25	41.0	100
Total	61	100	

Table 33 represents the responses to the sixth sub-question related to Level 3 of the revised hypothetical model (Figure 4); ‘I regularly engage in *face-to-face* updates with team members’. As can be seen from the results below in Table 33, the regular use of the sixth sub-question warrants its inclusion at Level 3 in the revised hypothetical model, Figure 4.

Table 33
'I regularly engage in 'face to face' updates with team members'

	Frequency	Percent	Cumulative Percent
Never Done	0	0	0
Done under supervision	0	0	0
Done without supervision	2	3.3	3.3
Often done or currently do	28	45.9	49.2
Managed across multiple projects	31	50.8	100
Total		100	

Table 34 represents the responses to the seventh and final sub-question related to Level 3 of the revised hypothetical model (Figure 4); 'I regularly engage in *face-to-face* updates with stakeholders'. As can be seen from the results below in Table 34, the regular use of the seventh sub-question warrants its inclusion at level 3 in the revised hypothetical model, Figure 4.

Table 34
'I regularly engage in 'face to face' updates with stakeholders'

	Frequency	Percent	Cumulative Percent
Never Done	0	0	0
Done under supervision	0	0	0
Done without supervision	4	6.6	6.6
Often done or currently do	26	42.6	49.2
Managed across multiple projects	31	50.8	100
Total	61	100	

4.2.3.1 Summary of Level 3

Data is examined in relation to Level 3 of the hypothetical model; i.e., the Figure 4 model devised from a review of extant literature. Table 35 is presented to demonstrate the respondents' indications of their use of People Specific Management (PSM). The questionnaire contained seven questions in the PSM section and the respondents indicated their use of the PSM knowledge area via a Likert scale; viz., 1 = never used, 2 = rarely used, 3 = occasionally used, 4 = often used, 5 = constantly used..

Table 35
People Specific Management (PSM)

	N	Minimum	Maximum	Mean	Std. Dev.
People-specific Management	61	1	5	3.84	.67

It is noted that the mean response is in the rating of ‘3 = occasionally used’ category. Also, the standard deviation of responses indicates the lowest spread of responses to date. Consequently, as in the discussion in the later part of Chapter 2, the success of the project management process and indeed the project manager (not examined in this research), arguably, hinges on the PMs ability, not just to identify, but liaise with and manage, every stakeholder; the process is cited often as a success factor for projects (Bourne & Walker 2006, p.6). The current research indicates that there is sufficient use of the knowledge area indicated at Level 3, albeit not as widely or consistently applied as the knowledge areas within Levels 1 and 2. Nevertheless, the reported usage of People-specific Management (PSM) is sufficient for its continued inclusion as Level 3 of the hypothetical model (Figure 4). Further research as suggested and discussed may lead to a greater understanding of the knowledge, both identified and utilised, in project management at Level 3. The inter-item consistency and reliability were confirmed viz., the knowledge area above receiving a Cronbach’s alpha value greater than .6; i.e., .71 (Cavana, Delahaye & Sekaran 2001, p.324)

4.2.4 Hypothetical Model – Levels 4, 5 and 6

Due to the specific nature of the major research question the derived minor questions and the emphasis on PM knowledge areas, the current research was not designed to investigate the project managers’ use of technical sector tools or sector techniques. Further, due to the sheer size (2,525,500 square kilometres) and geographical nature of Western Australia and the distribution of PMs throughout the State and the budgetary and time constraints in undertaking this research, it is acknowledged that they would constitute a separate study in their own right, with data being collected in each of the PM sectors as identified in Table 8. Having identified the specific knowledge, tools and techniques used in each sector, a further study could be undertaken to determine areas of similarity and difference across sectors. The outcomes from such studies would be a useful adjunct to the current findings.

Nevertheless, given the almost exclusive emphasis on PM training relying on PMBOK® and/or PRINCE2, the development of the revised hypothetical model (Figure 4) with its seven levels is a substantial finding in the current study. Levels 1 and 2 have been examined in some detail in relation to the concept of successful cross-sector transfer of PM knowledge by PMs and the relevance of Level 3 established.

However, it is the contention of the current researcher, that there is a critical need for new project managers to ascertain a base of working knowledge of the sector in which they are about to engage, or within which they find themselves operating. Consequently, the revised model in Figure 4, as interpreted from the literature discussed in Chapter Two, can be used as a more appropriate and holistic approach to project management.

4.3 Hypothetical Model – Level 7

Level 7 of the revised hypothetical model (Figure 4) depicts the pinnacle of a Project Manager; i.e., one who has progressed through the first six levels, is well-trained, qualified and experienced and, consequently, most able to transfer their PM knowledge successfully across sectors.

The researcher's previously unconfirmed belief that a number of PMs were operating in the workplace without formal PM training and qualifications was confirmed in the current study. 42.6% of Project Manager respondents reported having a lack of qualifications; e.g., 26.2% of respondents reported having 'no' PM qualifications and 16.4% reported that their PM qualifications were 'informal'. However, none of the respondents answered the open questions in relation to project management strengths or weaknesses and the statistics reported in this research, appear to suggest that the majority of these PMs are still utilising the suggested knowledge areas at various levels. The degree to which a lack of formal PM qualifications influences the PM and/or the project is a matter for future research.

As a result, it was deemed worthwhile to examine more precisely the relationship between the respondents' reporting of their use of PM knowledge areas and the status of their training and qualifications.

Thus, the histogram of each dependent variable was inspected. In nearly all cases the data was non-normally distributed, so the use of Analysis of Variance could not be justified, so the related non-parametric Kruskal-Wallis test was utilised as recommended by Field (2006, p.542). In addition, Walker et al. (1999, p.485) discuss the merits of using the Kruskal-Wallis non-parametric test to initiate analysis, “but many if not most statisticians appear to feel that it is desirable in many contexts to make fewer assumptions about the underlying populations from which the data are obtained than are required for a parametric analysis”.

According to Field (2006, pp.548-549), when utilising the Kruskal-Wallis test the crucial thing to look at is the significance value, which in the case of Integration Management is .013 (see Table 36 below). Because this value is less than .05, one may conclude that the fact that respondents *had* undertaken formal training or education does relate significantly to their rating in terms of integration management usage.

Further, Field (2006, pp.548-549) suggests taking note of the Monte Carlo estimate of significance, which in relation to integration management is a low .009; Field (2006) suggests this is the value researchers ought to use rather than the asymptotic value, if they yield different results.

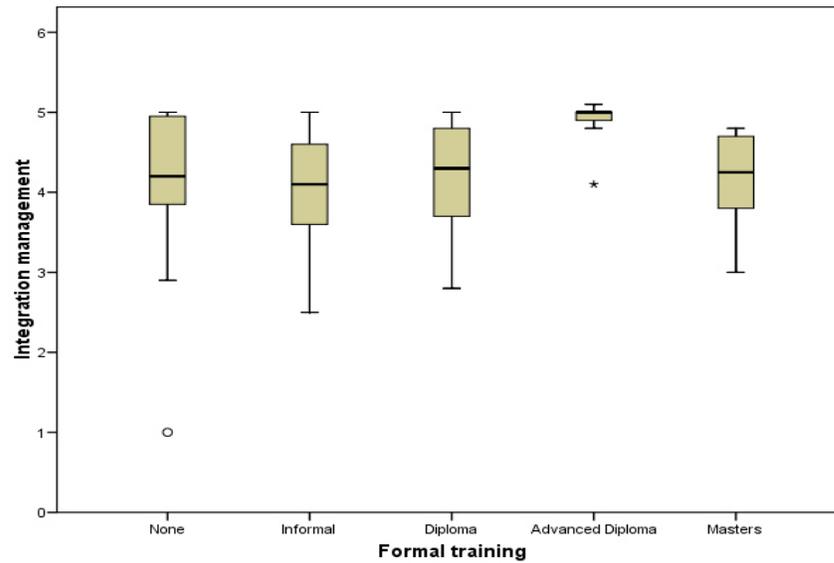
Also, Field (2006) suggests the confidence interval for significance is useful. In the case of Integration Management, the range of .007-.012 provides a 99% confidence; also, the fact that the upper boundary does not cross .05 supports the conclusion that it is significant (Zikmund 1997, p.562). However, although this provides strong evidence that the identified relationship is genuine, as with the one-way ANOVA, the Kruskal Wallis test highlights the fact that differences between the qualified and unqualified groups exist, but it doesn't describe exactly where the differences lie.

Table 36
PM Training and Use of Integration Management

Integration Management	Results
Chi square	12.631
df	4
Asymptotic Significance	.013
Monte Carlo – Significance	.009
99% Confidence Interval	
Lower Bound Limit	.007
Upper Bound Limit	.012

The following boxplot (Figure 5, n = 61) visually demonstrates details of the relationship between qualifications and use of integration management. The respondents who indicated having completed an advanced diploma are noticeably distinct from the others. This may be an indication that the training undertaken in this qualification, as confirmed in discussions with PMs with extensive experience in the vocational training sector, traditionally utilises case studies and workshop-type scenario learning; thereby, providing the respondents with the necessary confidence and understanding to practice their learning in the workplace. The tertiary institutions, as indicated by the respondents citing Masters as their qualification, could benefit their students from either a greater focus on, or at least inclusion of, the workshop and case study style adopted by the vocational training sector. It is noted that the spread of scores and the rankings from ‘Diploma’ students do not differ much from those of the unqualified PMs; this suggests that integration management may not be included in Diploma training programmes.

Figure 5
Type of PM Training and Use of Integration Management



4.3.1 Communication Management

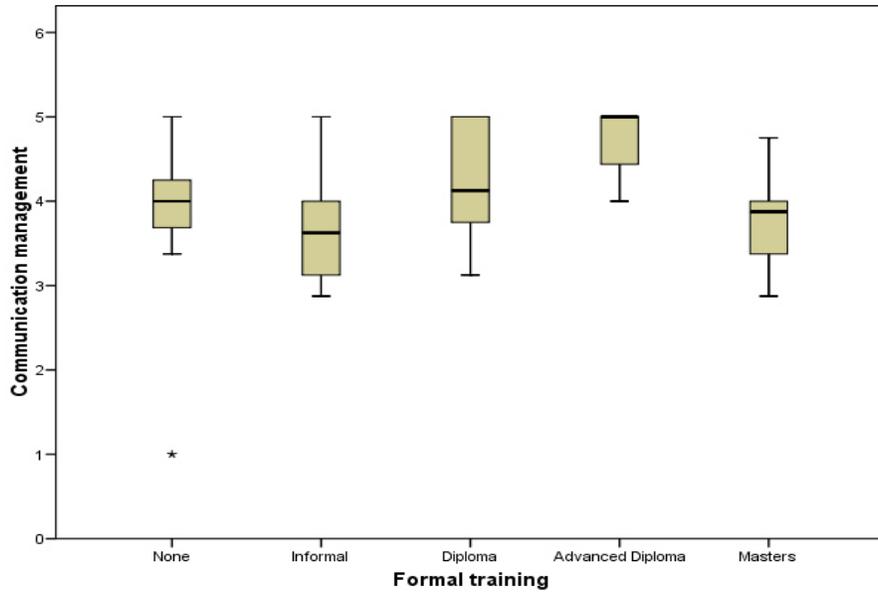
In Table 37, below, Communication Management also appears to be a knowledge area whose application may be affected by the respondents having undertaken formal education or training. Often, in management and project management theory and practice, communication management is discussed as being crucial to success; frequently, poor communication leads to poor results. Thus, at Level 7 one would expect a PM to perform very well in communicating.

Table 37
Type of PM Training and Use of Communication Management

Communication Management	Results
Chi square	14.774
df	4
Asymptotic Significance	.005
Monte Carlo – Significance	.004
99% Confidence Interval	
Lower Bound Limit	.002
Upper Bound Limit	.005

The following boxplot (Figure 6, n = 61) visually demonstrates the relationship between PM qualifications and use of communication management. Again, the respondents who have completed an advanced diploma are distinct from the others. However, this time there is a notable difference between the median of all the groups, with the possible exception of ‘Diploma’ and ‘None’ which bear the closest relationship. With very different mean responses, arguably it is the case that the current training experiences leading to PM qualifications do not have a direct relationship on the PMs’ performance in communication management. Nevertheless, further research could be undertaken to determine precisely why those completing ‘Advanced Diplomas’ make the greatest use of communication management.

Figure 6
Type of PM Training and Use of Communication Management



4.3.2 Risk Management

As is the case with communication management, risk management is an area indicated by the results as being significant in terms of the difference in terms of their use of the knowledge areas indicated in the questionnaire between those respondents who had undertaken formal education or training and those who had not (see Table 38).

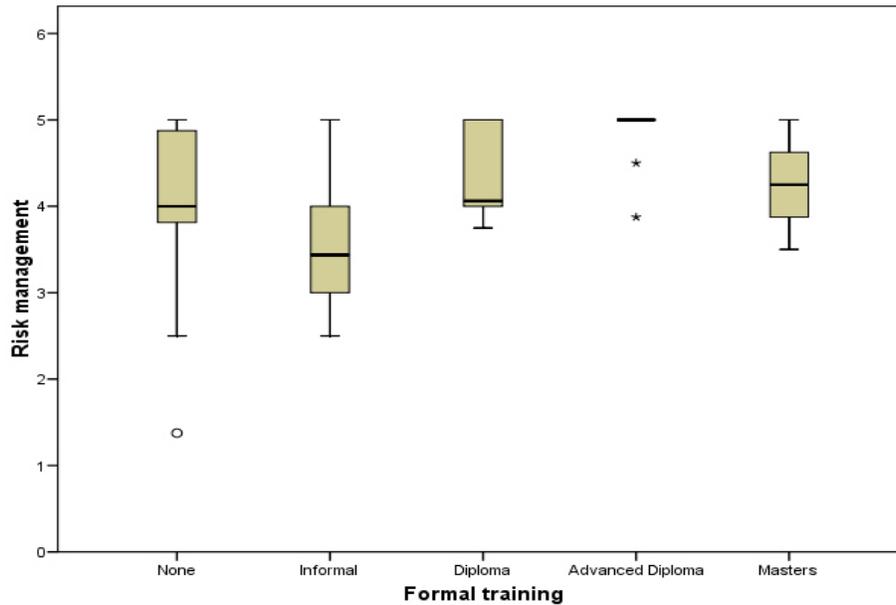
Table 38
Type of PM Training and Use of Risk Management

Risk Management	Results
Chi square	14.437
df	4
Asymptotic Significance	.006
Monte Carlo – Significance	.003
99% Confidence Interval	
Lower Bound Limit	.002
Upper Bound Limit	.005

When looking at the results in Table 38, it can be seen that the type of project management training and the use of risk management by the respondents appear significant. This may suggest that, in particular, those respondents who had previously undertaken an advanced diploma in project management, are more ‘comfortable’ in applying the risk management knowledge areas contained within the questionnaire.

The following boxplot (Figure 7, n = 61) visually demonstrates the relationship discussed above. The respondents who indicated having completed an advanced diploma, yet again, are noticeably distinct from the others. There is a notable difference between the median of all the groups, again with the possible exception of Diploma and None as bearing the closest relationship. The boxplot demonstrates that those respondents having completed an Advanced Diploma are indeed very tightly grouped; hence, they are condensed into a single black line. However, there are a couple of respondents outside of this tightly knit group (outliers) as indicated by the asterisks.

Figure 7
Type of PM Training and Use of Risk Management



4.3.3 Assurance Management

Assurance management (see Table 39) is another area indicated by the results as being significant in terms of the difference between those respondents who had undertaken formal education or training and those who had not, in terms of their use of the knowledge areas indicated in the questionnaire.

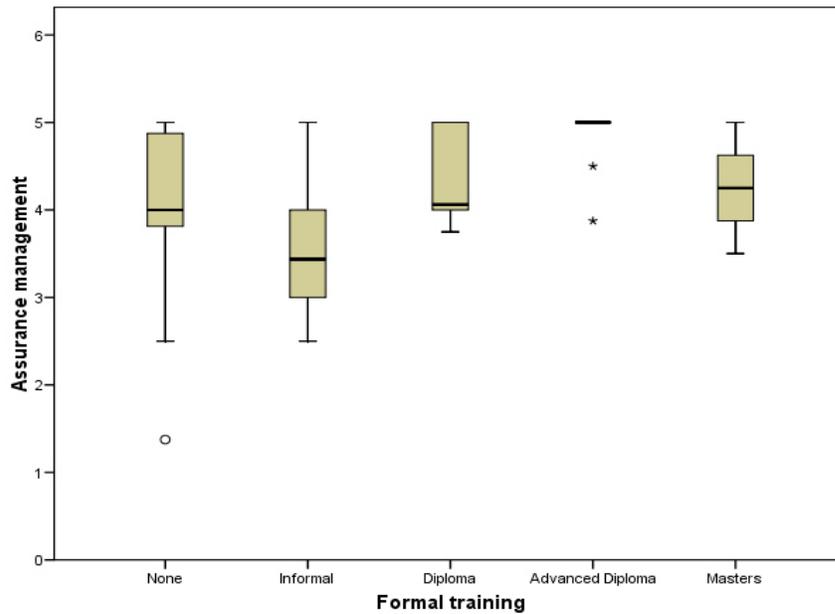
Table 39
Type of PM Training and Use of Assurance Management

Assurance Management	Results
Chi square	10.724
df	4
Asymptotic Significance	.030
Monte Carlo – Significance	.026
99% Confidence Interval	
Lower Bound Limit	.021
Upper Bound Limit	.030

The following boxplot (Figure 8, n = 61) visually demonstrates the relationship discussed above. Again, the respondents who indicated having completed an advanced

diploma are noticeably distinct from the others. There is a notable difference between the median of all the groups, again with the possible exception of Diploma and None as bearing the closest relationship.

Figure 8
Type of PM Training and Use of Assurance Management



4.3.4 General Management

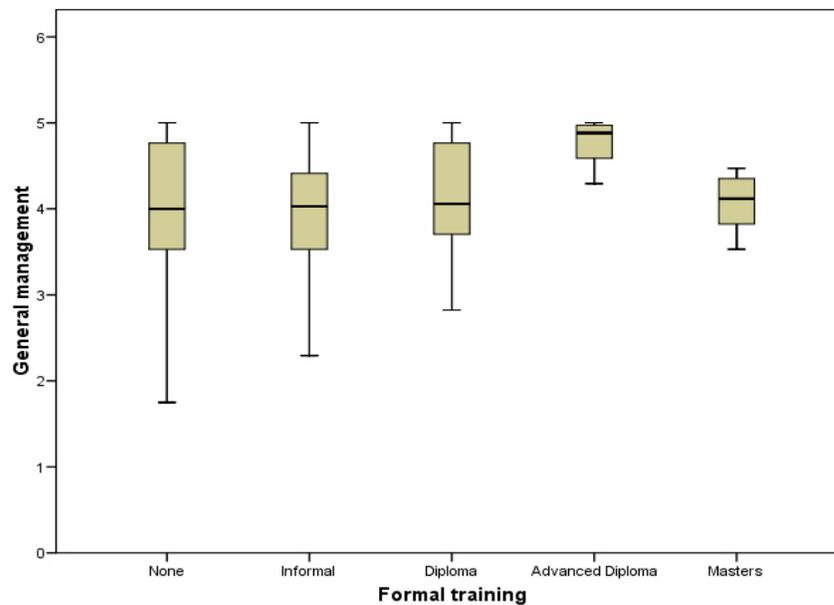
General management (see Table 40), is a further area indicated by the results as being significant in terms of their use of the knowledge areas indicated in the questionnaire depending on whether or not the respondents had undertaken formal education or training.

Table 40
Type of PM Training and Use of General Management

General Management	Results
Chi square	10.341
df	4
Asymptotic Significance	.035
Monte Carlo – Significance	.029
99% Confidence Interval	
Lower Bound Limit	.025
Upper Bound Limit	.034

The following boxplot (Figure 9, n = 61) visually demonstrates the relationship discussed above. The respondents who indicated having completed an advanced diploma, once again, are noticeably distinct from the others. There is no notable difference between the median of all the other groups.

Figure 9
Type of PM Training and Use of General Management



4.3.5 Client-side Management

Client-side management (see Table 41) is a further area indicated by the results as being significant in terms of the difference between those respondents who had

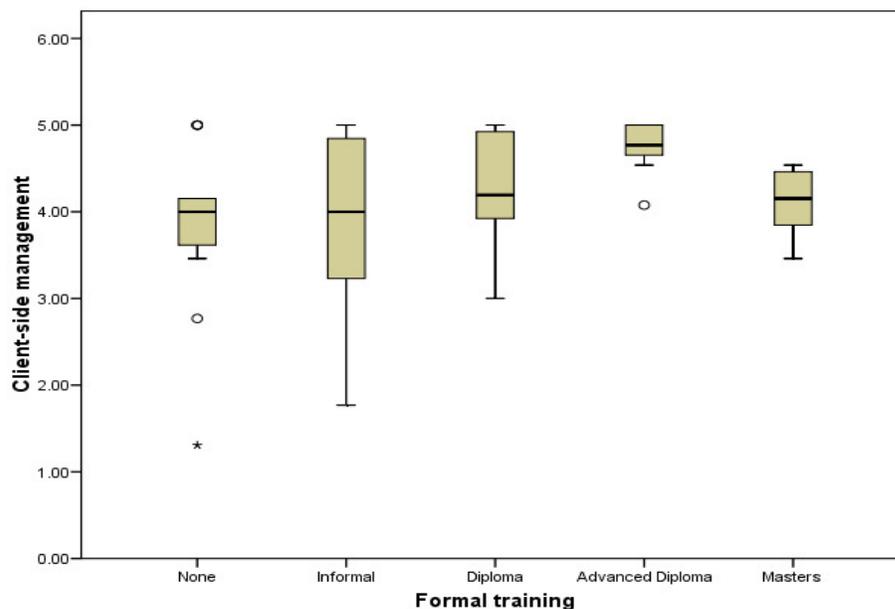
undertaken formal education or training and those who have not, in terms of their use of the knowledge areas indicated in the questionnaire.

Table 41
Type of PM Training and Use of Client-side Management

Client-side Management	Results
Chi square	11.562
df	4
Asymptotic Significance	.021
Monte Carlo – Significance	.018
99% Confidence Interval	
Lower Bound Limit	.014
Upper Bound Limit	.021

The following boxplot (Figure 10, n = 61) visually demonstrates the relationship discussed above. The respondents who indicated having completed an advanced diploma are once again noticeably distinct from the others; there is no notable difference between the median of all the other groups.

Figure 10
Type of PM Training and Use of Client-side Management



4.3.6 *Post Hoc Testing: Type of PM Training and Use of Knowledge Areas*

To verify the above results, it is possible to conduct post hoc tests subsequent to Kruskal-Wallis testing, as discussed by Field (2006, p.550). The post hoc testing undertaken was carried out using Mann-Whitney, and to minimise the occurrence of the Type 1 error rate, the Bonferroni correction was utilised; as discussed by Zikmund (1997, p.565), “simply put, a Type 1 error occurs when the researcher concludes that there is a statistically significant difference when, in reality, one does not exist”. As suggested by Field (2006, p.550), this entailed dividing the critical value of .05 by the number of tests conducted, which in the post hoc test conducted for this research was $.05/4 = 0.0125$. The survey instrument results chosen for the post hoc testing were those indicating utilisation of the various knowledge areas; the comparison was between participants who indicated ‘none’ with regard to their PM qualifications/training and those that indicated having either ‘informal’, ‘diploma’, ‘masters’ or ‘advanced diploma’ qualifications. As noted in Table 42, the comparison indicated possible significance between ‘none’ and the ‘advanced diploma’ in the use of knowledge areas of Integration, Communication, Risk, Assurance and Client-side. These five areas indicated possible significance due to having a value of less than 0.0125.

Table 42
Comparing PM Qualifications: ‘None’ vs. an ‘Advanced Diploma’

PM Management Usage	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig.2-tailed	Exact Sig.
Integration	35.0	171.0	-2.688	.007	.008
Scope	38.0	174.0	-2.507	.012	.013
Time	59.0	195.0	-1458	.145	.162
Cost	61.0	197.0	-1.349	.177	.195
Quality	45.5	181.5	-2.141	.032	.034
Resource	60.5	196.5	-1.370	.171	.178
Communication	29.0	165.0	-3.007	.003	.003
Risk	35.5	171.5	-2.754	.006	.008
Procurement	67.0	203.0	-1.049	.294	.318
Administration	40.5	176.5	2.429	.015	.017
Assurance	37.0	173.0	-2.544	.011	.011
Continued ...					

PM Management Usage	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig.2-tailed	Exact Sig.
... Continued					
General Mgt	39.5	175.5	-2.414	0.16	.015
Client-side	29.0	165.0	-2.943	.003	.003
Executive	54.0	190.0	-1.680	.093	.099
Supplier-side	48.0	184.0	1.978	.048	.050
People specific	64.5	200.5	-1.166	.244	.251

As previously discussed, Table 42 above demonstrates the possible relationship between those respondents who indicated ‘None’ and those who indicated having undertaken formal education or training in respect to the application of the knowledge areas within the questionnaire. However, rather than draw too much inference from the results, they may be considered useful in indicating areas for further research.

4.3.7 Summary of Type of PM Training and Use of Knowledge Areas

The type of PM training in relation to the practice of the questionnaire knowledge areas has been included as a point of interest, and as a basis for more in-depth future research. The current researcher considers that the area of PM training and, in particular, the format in which it is conducted, may well influence the future practices that a project manager adopts in relation to the application of the knowledge areas as outlined in this research. In terms of the current research, this may imply that ‘qualifications’ do make a difference, particularly when obtained via the Advanced Diploma training model, whereas, other traditional education and training areas, such as post-graduate education, are not as effective to the practising PM (discussed in 5.2.1 PM Education). Further research is suggested in this area as, if this was to be the case, changes to education and training are essential. Thus, it is suggested that ‘None’ and ‘Informal’ training are not acceptable in a ‘profession’. If transfer of PMs across sectors is to work to the advantage of professionals and the organisations that employ them, training needs to be ‘compulsory’ and follow the developmental process described in the hypothetical model (Figure 4).

4.4 Relationship between Industry Sector and use of PM Knowledge Areas

As used by Field (2006), the Kruskal-Wallis test criteria were previously supported by Hagerman and Senbet (1976, p.513) because “this powerful nonparametric test is designed to determine if several independent groups of data have the same distribution”. Previously utilised in Section 4.4 of the current research thesis, it has been used in this section to test whether or not PMs operating in particular sectors apply the identified knowledge areas to a greater or lesser extent. As previously discussed, the respondents were grouped according to their sector response in the questionnaire; e.g., the ‘building and construction’ grouping contains all respondents who indicated sectors such as building maintenance, property services, civil construction and general construction (see Table 9).

4.4.1 Risk Management

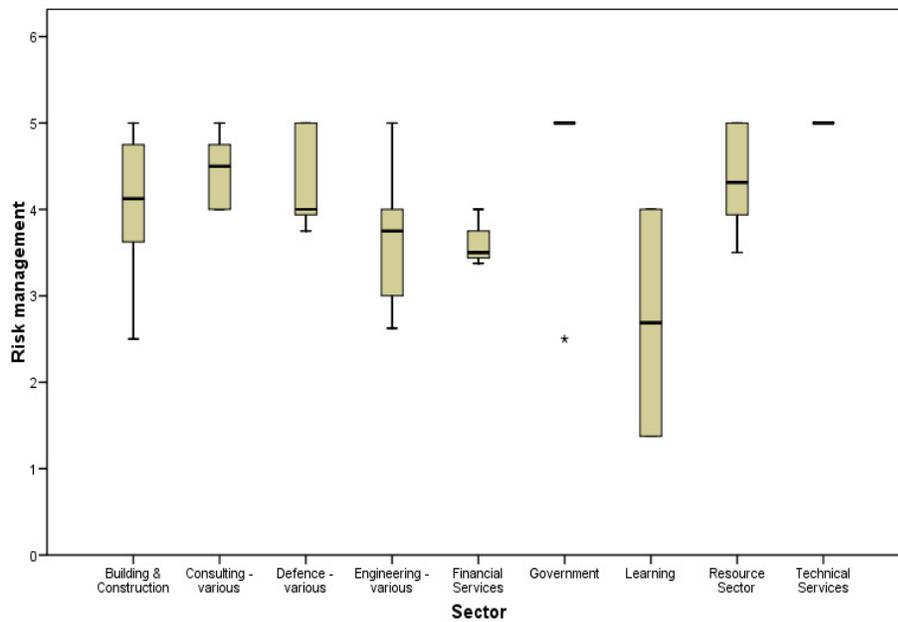
As can be seen in Table 43 below, risk management appears to be a knowledge area whose application is affected by the respondents’ particular sector of operation. This may suggest a greater propensity toward the identification and proactive management of risk in particular sectors. An additional point of possible interest to both educators and employers is that risk management also is significant in the previous section relating to education and training (see Table 38). Thus, it is suggested that individual sectors may require a greater focus on the identification and management of risk both from an education (of potential staff) and operational perspective.

**Table 43
Risk Management and Industry Sector**

Risk Management	Results
Chi square	18.662
df	8
Asymptotic Significance	.017
Monte Carlo – Significance	.008
99% Confidence Interval	
Lower Bound Limit	.006
Upper Bound Limit	.010

The following boxplot (Figure 11, n = 61) visually demonstrates the relationship discussed above. The median for each sector shows differences in the application of risk management. The respondents indicating their sector as Government or Technical Services appear to apply the risk knowledge areas at a possibly consistent level, followed closely by Consulting Various. The Learning sector appears to contain the lowest use of risk management, although it is necessary to be cognisant of the fact there were only two respondents who indicated this particular sector.

Figure 11
Risk Management and Industry Sector



4.4.2 Administration Management

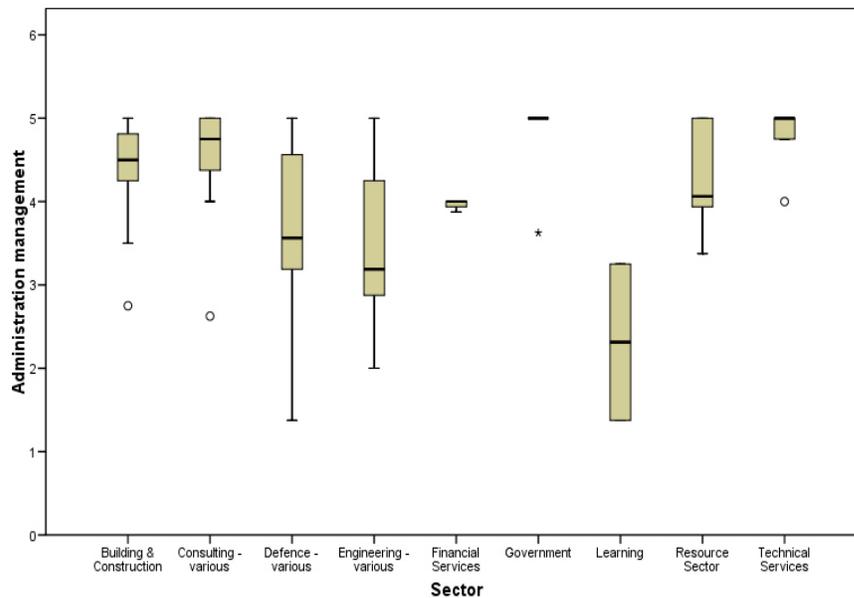
Administration Management, as can be seen in Table 44 below, appears to be a knowledge area whose application may be affected by the respondents' particular sector of operation. This may suggest a greater propensity toward the practice of Administration Management in particular sectors.

Table 44
Administration Management and Industry Sector

Administration Management	Results
Chi square	18.662
df	8
Asymptotic Significance	.017
Monte Carlo – Significance	.008
99% Confidence Interval	
Lower Bound Limit	.006
Upper Bound Limit	.010

The following boxplot (Figure 12, n = 61) visually demonstrates the relationship discussed above. The median of all sectors shows differences in the application of administration management. The respondents indicating their sector as Government, Technical Services and Consulting Various appear to apply the administration knowledge areas at a possibly consistent level, followed closely by Building and Construction. The Learning sector again appears to contain the lowest use of Administration Management, although it is necessary to be cognisant of the fact there were only two respondents who indicated this particular sector.

Figure 12
Administration Management and Industry Sector



4.4.3 Summary of Relationship Between Industry Sector and Use of PM Knowledge Areas

In summarising the relationship between industry sector and the use of the PM knowledge areas, as indicated in the questionnaire (see Appendix 3), it appears there may be some variation in their application. However, as only two areas were indicated as being possibly significant with an asymptotic significance of less than .05, *viz.*, 'Risk' and 'Administration', it may be concluded that the majority of the tested PM knowledge areas are indeed used widely across various sectors. As discussed previously, the variation may be caused, in part, due to the differing 'levels' of PM education and training and or, in fact, the 'type' of PM training.

4.5 Hypothesis Testing

Hypothesis 1

H₀₁: Project management can be considered a discipline that facilitates individual practitioners applying their knowledge across different sectors.

H_{A1}: Project management can be considered a discipline that restricts individual practitioners from applying their knowledge across different sectors.

As indicated earlier in this chapter, this proposition was tested utilising the non-parametric Kruskal-Wallis test in the SPSS software package. The results were significant. All effects are reported as having a $p < .05$.

Thus, the alternative hypothesis is rejected, based on the consistency of the respondents when indicating their use of the knowledge areas (see Section 4.3), regardless in which sector they either originated, or are currently operating. Further, it is rejected, subsequent to the non-parametric test conducted (see Section 4.5) where only the two areas of risk and administration management were indicated as being significant.

Hypothesis 2

Ho2: Project managers in differing sectors can be considered to utilise common knowledge areas.

HA2: Project managers in differing sectors can be considered to utilise uncommon knowledge areas.

As indicated earlier in this chapter, the proposition was tested utilising the non-parametric Kruskal-Wallis test in the SPSS software package. The results were significant.

Again, the alternative hypothesis is rejected, based on the consistency of the respondents when indicating their use of the knowledge areas (see Section 4.3), regardless in which sector they either originated or are currently operating. Similarly, it is rejected subsequent to the non-parametric test conducted (see Section 4.5) where only the two areas of 'Risk' and 'Administration management' were indicated as being significant.

Hypothesis 3

Ho3: Project managers can be considered able to utilise knowledge from one sector in a different sector.

HA3: Project managers can be considered unable to utilise knowledge from one sector in a different sector.

When considering hypothesis three, it is necessary to consider two differing factors; the first one relates to project management knowledge (the focus of this research) and the second one relates to sector knowledge. In relation to project management knowledge, the alternative hypothesis is rejected for the same reasons as stated in hypotheses one and two, as only two of the PM Knowledge areas were indicated as being possibly significant with an asymptotic significance of less than .05, *viz.*, 'Risk' and 'Administration', it may be concluded that the majority of the tested PM knowledge areas are indeed used widely across various sectors. As previously stated

(Section 4.3.4), the current research did not examine the sector knowledge of the participants. Therefore, hypothesis three can be neither totally confirmed nor totally rejected.

Hypothesis 4

Ho4: Project managers can be considered to be able to apply a larger amount of knowledge from managing projects in one sector (in which they are familiar), to another sector (in which they are unfamiliar).

HA4: Project managers can be considered to be able to apply a limited amount of knowledge from managing projects in one sector (in which they are familiar), to another sector (in which they are unfamiliar).

In considering hypothesis four, the alternative hypothesis is rejected; again, for the same reasons the alternative hypotheses for one and two were rejected. It is considered that, as indicated by the respondents, not only is the project management knowledge consistent across sectors but, as with areas such as general management and administration management, it is able to be applied in unfamiliar sectors.

4.5.1 Summary of Testing of Hypotheses

In summarising the results of testing the hypotheses, the research began with the major research question (see Section 1.5): *What core Project Management knowledge areas are transferable from one discipline to another?* The results indicate that the project management knowledge areas identified from extant literature and included within Levels 1 and 2 of the revised hypothetical model (Figure 4), and detailed in the questionnaire utilised for this research, *can* be considered to be transferable and relevant for project managers moving from a sector in which they are familiar to a sector in which they are unfamiliar.

4.6 Limitations and Sources of Possible Error

When considering adopting any conclusions or recommendations from the current research, it is prudent to take into account the possible errors that may have resulted and the limitations accompanying the overall research project.

Limitations of the study, e.g., those arising from the respondents being drawn from a relatively small population of practising project managers and predominantly from Western Australia, may have resulted in a particular bias towards the survey instrument.

Another possible source of error may lie in the nature of the model or survey instrument itself, even though thorough testing of the instrument was conducted prior to general circulation. The testing conducted was to ensure clarity of understanding of the questions as detailed; though it is not possible ever to be completely sure that true clarity of understanding exists.

Furthermore, it is possible that errors may have occurred in the entry of the data into the SPSS software package.

Also, there exists the possibility that some respondents may have overstated their use of the knowledge areas; or, conversely, understated their use. Further, it is possible that the respondents consisted mainly of those project managers who related strongly to the knowledge areas as indicated. On the other hand, project managers who did not relate to the knowledge areas in the survey instrument may have declined to participate in the research.

As is often the case with this type of research project, budget and resource constraints limit the 'reach' of the primary researcher.

Chapter 5: CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This current research project was developed to investigate the PM knowledge areas and possible implications in regard to PM training and the generic nature of project management, i.e. can a project manager who has conducted projects in a given sector, conduct projects in an unfamiliar sector. The framework of this research was to establish the need to examine this issue via the answering of the following:

- What is Project Management?
- How does extant research literature describe the fundamental activities of a Project Manager?
- What management knowledge areas are commonly used by project managers in different professional disciplines?
- What additional management knowledge is used by project managers in different professional disciplines?

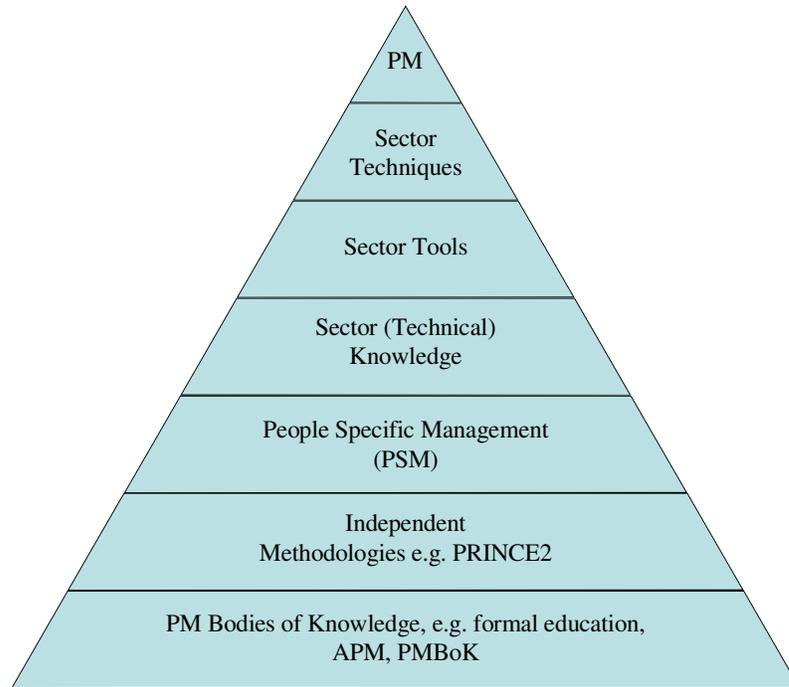
It was established in Chapter 1, that little prior research had been conducted into the implications or knowledge requirements placed on, or for, project managers seeking to manage projects in a sector differing from the one in which they originally gained their experience. An initial discussion in Chapter 1 related to whether or not project managers require technical knowledge of a given sector or can rely on their project management knowledge for the ability to manage projects in unfamiliar sectors. Chapter 2, via use of extant literature, the current and previous discussions on related topics were investigated i.e., skill versus knowledge and what constitutes knowledge. Further, different frameworks for the management of projects were researched in Chapter 2 to attempt to ascertain the likely support, or otherwise, this may provide to project managers seeking to transfer from one sector to another. Subsequently, a hypothetical model derived from extant literature (Figure 3) was suggested; the establishment of Figure 3 facilitated the development of the revised hypothetical model (Figure 4) and the development of the research hypotheses.

Chapter 3 discussed the research paradigm, the methodology and the development of the research instrument (first verified by a focus group of practising project managers and subsequently distributed further afield). The resultant revised hypothetical model (Figure 13) is a confirmation of Figure 4 and shown below. When considering the revised model, it is important to note the introduction of PSM at Level 3.

The current research has indicated there are project managers 'operating' with little or no formal education, or training, in project management and further indicates, due to the lack of 'practice', a reduced use of PSM knowledge or skills. Neither of these situations is acceptable in normal general management practice and, therefore, it is argued that they are not acceptable in project management practice. Similarly, the standing of project management as a 'profession' will remain contentious while limited PM training is accepted.

The significance of project managers to industry in general, as can be seen by the value of projects managed (Appendix 2), would appear to suggest attention to the provision of a structured approach to the development of project managers is of increasing importance, if not essential. Although the respondents were given the opportunity to suggest additional knowledge areas not covered by the questionnaire and to participate in two open-ended questions as to their perceived strongest and weakest knowledge areas, virtually none did so. This may suggest they do not have the requisite knowledge or have not been trained to interrogate the occupation in which they find themselves. This further suggests that the need for the structured project management approach as suggested in Figure 13 is validated.

Figure 13
Revised Model (Figure 4)



By means of the analysis of the data derived from the survey instrument, Chapter 4 analysis provided support to the hypothetical models (Figures 3 and 4) and validated the inclusion of PSM at Level 3 of the revised model presented finally as Figure 13 above.

5.1 Conclusions

Key issues addressed by this research are clarification of the project management roles and responsibilities, as practised ‘in the field’ by project managers and the testing of the hypotheses below.

Hypothesis 1

Ho1: Project management can be considered a discipline that facilitates individual practitioners applying their knowledge across different sectors.

HA1: Project management can be considered a discipline that restricts individual practitioners from applying their knowledge across different sectors.

Hypothesis 2

Ho2: Project managers in differing sectors can be considered to utilise common knowledge areas.

HA2: Project managers in differing sectors can be considered to utilise uncommon knowledge areas.

Hypothesis 3

Ho3: Project managers can be considered able to utilise knowledge from one sector in a different sector.

HA3: Project managers can be considered unable to utilise knowledge from one sector in a different sector.

Hypothesis 4

Ho4: Project managers can be considered able to apply a larger amount of knowledge from managing projects in one sector (in which they are familiar), to another sector (in which they are unfamiliar).

H_{A4}: Project managers can be considered able to apply a limited amount of knowledge from managing projects in one sector (in which they are familiar), to another sector (in which they are unfamiliar).

The testing of the above hypotheses, as conducted in Chapter 4, lead the researcher to believe that the PM knowledge areas examined are utilised across differing sectors. However, subsequent informal discussions with members of the focus group suggest project managers do require a substantial understanding of knowledge in the sector in which they seek to operate. This view is supported by Sullivan (2008, p.55); “It’s not quite true to say that if you’re a project manager you can manage any project.” However, this does not stop the PM transferring from one sector to another, even an unfamiliar sector; it merely means the PM needs to quickly acquire knowledge of the sector in terms of processes, tools and techniques.

Organisations that rely on programs and projects to support the delivery of their strategic objectives will benefit from implementation of the project management revised hypothetical model (Figure 13). It will result in the better management of the development of project managers and, therefore, assist to achieve an organisation’s objectives and improved management of projects themselves. To achieve this outcome will require changes to education and management practice (in relation to PM), also procedures and changes to the culture of some organisations, to enable the revised model (Figure 13) to be accepted as the process whereby the business delivers its project objectives.

5.1.1 Managerial and Theoretical Implications

The managerial and theoretical implications of this research into project management knowledge areas and their transferability within different sectors within Western Australia, are in large part, are dependent on a firm’s managerial style and attitude rather than on the deployment of specific tools used for the management of projects. Focusing on developing conceptual thinking and the People Specific Management skills discussed at Level 3 within the revised hypothetical Model Figure 4, will improve learning ‘as to’ how to understand a project’s entire landscape, facilitating long-term success in the management of projects. As this study has illustrated, it is not enough for educators in project management to concentrate on developing processes

and practices such as PRINCE2 and PMBOK® at the exclusion of People Specific Management (PSM).

In addition to the theoretical contributions described, this study has provided new insights for the development of project managers and future research is recommend on how this research may impact the understanding of the theory of project management.

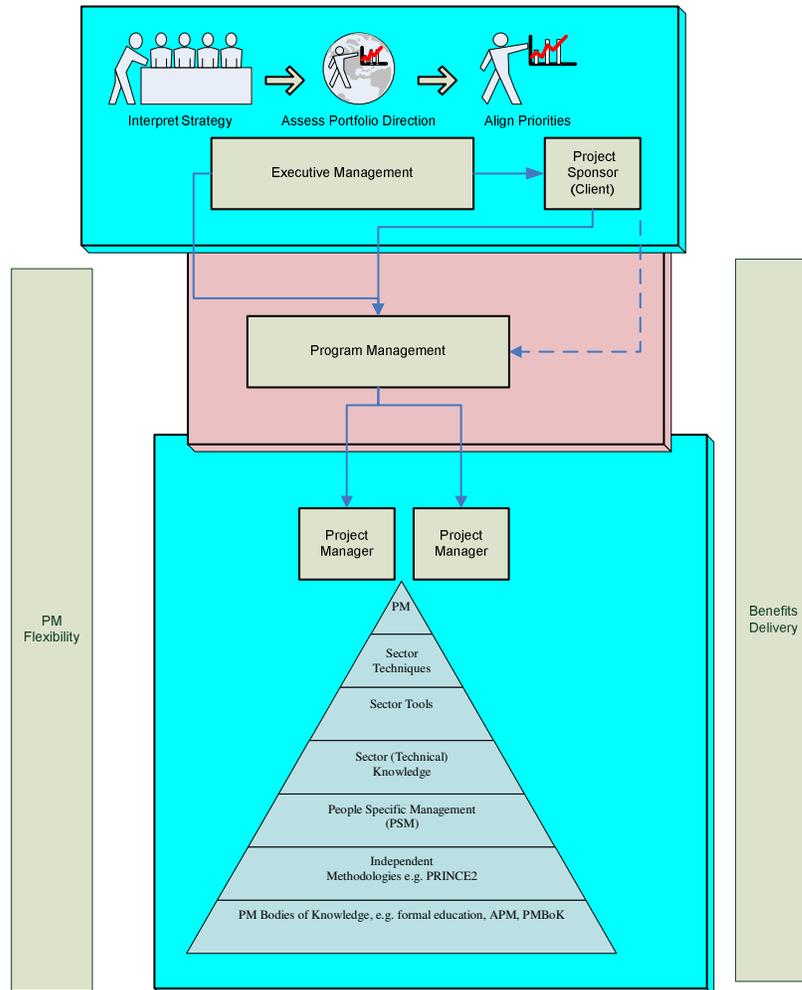
5.2 Recommendations

The revised model (Figure 13) demonstrates that the project manager is required to gain significant underpinning knowledge, as represented at Levels one, two and three. The firms' employing project managers are subsequently and/or concurrently required to assist with the further development of PMs by providing the structure indicated at Levels four, five and six. Universities, training organisations and knowledge providers, should use the revised model as the basis for the future development of structured education programs; this will assist in ensuring the required resultant, fully competent and rounded project management professional.

Structured project management suggests managing the project in a logical, organised way, following defined steps. A structured project management method is the written description of this logical, organised approach. It is critical the development of PMs needs to be viewed in a similar way. In applying the structure of the revised hypothetical model (Figure 13), industry in general will benefit from the increased professionalism of their PMs.

Figure 14, below, outlines the contribution and positioning of the model in an organisational context. The importance of applying the suggested structured approach to the development of PMs and the benefits in terms of the flexibility of the project managers themselves and the delivery of the organisations strategy is also illustrated in the Figure 14.

Figure 14
Revised PM Model (Figure 13) in an Organisational Context



In positioning the revised hypothetical model within the organisational context as outlined above, the contribution that a ‘well rounded’ PM will make to deliver the organisation's strategy is demonstrated.

5.2.1 PM Education

Qualifications for PMs do make a difference, particularly when obtained via the Advanced Diploma training model, whereas, other traditional education and training areas, such as post-graduate education do not appear as effective to the practising PM.

This may be due to the focus of participants in the Advanced Diploma programs being required to demonstrate competencies across a broad range of technical and management functions and generate ideas through analysis of information and concepts at an abstract level. Participants in these programs are further required to “demonstrate accountability for personal outputs within broad parameters” (Board 2007, p.57). The focus here is on the demonstration of competency, rather than intellectual ability. Further research is suggested in this area, as changes to education and training are essential if transfer of PMs across sectors is to work to the advantage of professionals and the organisations that employ them; training needs to be ‘compulsory’ and follow the developmental process described in the hypothetical model (Figure 13).

5.2.1.1 People Specific Management (PSM)

It was noted when analysing Level 3 in Chapter 4 that the mean response in the rating of ‘3 = occasionally used’ category and also, the standard deviation of responses indicated the lowest spread of responses. Consequently, the current research indicates that there is sufficient use of the knowledge area indicated at Level 3 to be included in the revised model, but further research is suggested, as it may lead to a greater understanding of the knowledge, both identified and utilised, in project management at Level 3. A particular focus is recommended on the question: ‘I have promoted active disagreement in the project team’. This question demonstrates the greatest variance in the responses uncovered during this research. The number of respondents who indicated ‘Never Done’ when considering the promotion of active disagreement, is worthy of further research and a topic worthy of discussion amongst providers of PM training and education.

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APPENDICES

Appendix 1 – AIPM Endorsed Training Courses

State	Course Provider	Courses Offered	Delivery Modes	Contact	National
NSW	ACPM - Australian College of Project Management (Formerly CPMG)	<ul style="list-style-type: none"> • RegPM Assessment Preparation • Short: Fundamentals in Project Management • Certificate IV in Project Management • Diploma of Project Management • Advanced Diploma of Project Management 	<ul style="list-style-type: none"> • Classroom • Face to Face • Workshop • Classes/On-site • (NB In-house & Public) • Fast track • Workplace based assessment 	ACPM - Australian College of Project Management (Formerly CPMG)	Yes
NSW	AGS Consulting & Training (Greco Schwartz Pty Ltd)	<ul style="list-style-type: none"> • Short: Project Management Basics • Short: Managing Projects/Leading Teams • Short: Leading Project Managers • Programs & Portfolios • Diploma of Project Management 	<ul style="list-style-type: none"> • Short courses 	AGS Consulting & Training (Greco Schwartz Pty Ltd)	No
National	AIM - Australian Institute of Management	<ul style="list-style-type: none"> • Short: Project Management Fundamentals • Short: Advanced Project Mgmt • Certificate IV in Project Management • Diploma of Project Management 	<ul style="list-style-type: none"> • Face to face • classroom • experiential • workplace based assessment. 	AIM - Australian Institute of Management	Yes
WA	APMM Group Ltd	<ul style="list-style-type: none"> • Diploma of Project Management • Advanced Diploma of Project 	<ul style="list-style-type: none"> • Face to face - Public classes & On-site • Electronic correspondence • Fast Track. 	APMM Group Ltd	Yes

		Management <ul style="list-style-type: none"> • Certificate IV in Project Management 			
QLD	Aqua Projects	<ul style="list-style-type: none"> • Short: Successfully Managing Projects 	<ul style="list-style-type: none"> • Classroom/Lecture • Workshops (NB - in-house only • face-to-face). 	Aqua Projects	Yes
NSW	Asia Pacific International College	<ul style="list-style-type: none"> • Master of Business Administration (Project and Program Management) 	<ul style="list-style-type: none"> • Face to face • Workshop • Online • (NB In-house & Public) • Web-based 	Asia Pacific International College	Yes
ACT	Australian Institute of Management	<ul style="list-style-type: none"> • Short: Advanced Project Mgmt 	<ul style="list-style-type: none"> • Face to face • classroom • experiential • workplace based assessment. 	Australian Institute of Management	No
NSW	Australian Institute of Management	<ul style="list-style-type: none"> • Short: Project Management Fundamentals • Short: Advanced Project Mgmt • Certificate IV in Project Management • Diploma of Project Management 	<ul style="list-style-type: none"> • Face to face • classroom • experiential • workplace based assessment. 	Australian Institute of Management	No
QLD	Australian Institute of Management - QLD & NT	<ul style="list-style-type: none"> • Certificate IV in Best Practice PM • Certificate IV in Project Management • Diploma of Project Management 	<ul style="list-style-type: none"> • Face to face • online (Cert. IV) 	Australian Institute of Management - QLD & NT	No
ACT	Australian National University	<ul style="list-style-type: none"> • Short: Mgmt Framework for Business Projects • Graduate Certificate in Management (Project Management) 	<ul style="list-style-type: none"> • Face-to-face • Classroom/lecture 	Australian National University	No
ACT	Bayley & Associates Pty Ltd	<ul style="list-style-type: none"> • Diploma of Project Management 	<ul style="list-style-type: none"> • Face to face • distance learning 	Bayley & Associates Pty Ltd	Yes
NSW	BlueVisions Management	<ul style="list-style-type: none"> • RegPM Assessment 	<ul style="list-style-type: none"> • Classroom • Face to face and 	BlueVisions Management	Yes

	Pty Ltd	<ul style="list-style-type: none"> Preparation • Short: Fundamentals in Project Management • Short: Stakeholder Relationship Management • Certificate IV in Project Management • Diploma of Project Management • Advanced Diploma of Project Management 	Workshop (In-house and Public)	Pty Ltd	
QLD	Bond University	<ul style="list-style-type: none"> • Master of Project Management 		Bond University	No
QLD	Brisbane North Institute of TAFE	<ul style="list-style-type: none"> • Diploma of Project Management 	<ul style="list-style-type: none"> • Accelerated face to face workshops • mentoring support • on-site delivery • on-campus delivery 	Brisbane North Institute of TAFE	No
NT	Charles Darwin University	<ul style="list-style-type: none"> • Certificate IV in Project Management • Diploma of Project Management 	<ul style="list-style-type: none"> • e-Learning • Distance 	Charles Darwin University	No
VIC	Chifley Business School	<ul style="list-style-type: none"> • Diploma of Project Management • APESMA Master of Business Administration • APESMA Master of Business Administration (Technology Management) 	<ul style="list-style-type: none"> • Face to face • Online • Distance • Workplace assessment • Web-based 	Chifley Business School	Yes
NSW	Codarra Advanced Systems Pty Ltd	<ul style="list-style-type: none"> • Certificate IV in Best Practice PM • Diploma of Project Management 	<ul style="list-style-type: none"> • Face to face • in-house/public 	Codarra Advanced Systems Pty Ltd	No
NSW	Codarra Advanced Systems Pty Ltd	<ul style="list-style-type: none"> • Certificate IV in Project Management • Diploma of 	<ul style="list-style-type: none"> • Face to face • in-house/public 	Codarra Advanced Systems Pty Ltd	Yes

		<p>Project Management</p> <ul style="list-style-type: none"> Advanced Diploma of Project Management 			
VIC	Codarra Advanced Systems Pty Ltd	<ul style="list-style-type: none"> Certificate IV in Best Practice PM Diploma of Project Management 	<ul style="list-style-type: none"> Face to face in-house/public 	Codarra Advanced Systems Pty Ltd	No
QLD	Current Training QLD Pty Ltd	<ul style="list-style-type: none"> Certificate IV in Project Management Diploma of Project Management 	<ul style="list-style-type: none"> Classroom Face to face Distance Workshop Classes/On-site Workplace based assessment 	Current Training QLD Pty Ltd	No
WA	Curtin University of Technology - Faculty of the Built Environment, Art and Design (Bentley Campus)	<ul style="list-style-type: none"> Short: Project Management Fundamentals Graduate Certificate (Project Management) Graduate Diploma Project Management Master of Science (Project Management) 	<ul style="list-style-type: none"> Face to face online 	Curtin University of Technology - Faculty of the Built Environment, Art and Design (Bentley Campus)	Yes
ACT	DNA Project Mentors	<ul style="list-style-type: none"> RegPM Assessment Preparation Diploma of Project Management 	<ul style="list-style-type: none"> Classroom Face to face Workshop Classes/On-site 	DNA Project Mentors	Yes
VIC	Engineering Education Australia	<ul style="list-style-type: none"> Short: Managing Self & Others Short: Project Management Short: Contract Management Diploma of Project Management Unit: Project Management – Tools & Techniques Unit: Project Management – 	<ul style="list-style-type: none"> Classroom Workshop Distance Face-to-Face 	Engineering Education Australia	Yes

		Procurement & Contracts <ul style="list-style-type: none"> Unit: Project Management – People Management 			
NSW	Equest Consulting (a division of DWS)	<ul style="list-style-type: none"> Short: Project Management Fundamentals 	<ul style="list-style-type: none"> Classroom Face to face Classes/On-site 	Equest Consulting (a division of DWS)	Yes
NSW	ESI International	<ul style="list-style-type: none"> Project Management Certification Program Certificate IV in Project Management Diploma of Project Management Advanced Diploma of Project Management Master's Certificate in Project Management 	<ul style="list-style-type: none"> Face to face Public classes & On-site Electronic correspondence Fast Track 	ESI International	Yes
NSW	Hain Consulting Pty Ltd	<ul style="list-style-type: none"> Managing Projects and Professional Services 	<ul style="list-style-type: none"> Workshop 	Hain Consulting Pty Ltd	Yes
NSW	iknowma Pty Ltd	<ul style="list-style-type: none"> RegPM Assessment Preparation Short: Best Practice in Project Mgmt Diploma of Project Management Advanced Diploma of Project Management 	<ul style="list-style-type: none"> Classroom face to face workshop 	iknowma Pty Ltd	Yes
TAS	Institute of TAFE Tasmania	<ul style="list-style-type: none"> Certificate IV in Project Management Certificate IV in Government (Project Management) 	<ul style="list-style-type: none"> Face to face Online Distance 	Institute of TAFE Tasmania	Yes

		<ul style="list-style-type: none"> • Diploma in Government (Project Management) • Diploma of Project Management • Advanced Diploma of Project Management 			
VIC	iPM Group	<ul style="list-style-type: none"> • RegPM Assessment Preparation • Short: Project Management Essentials 	<ul style="list-style-type: none"> • Workshop 	iPM Group	Yes
WA	Keith O'Shea Program Management	<ul style="list-style-type: none"> • RegPM Assessment Preparation • Short: Project Management Fundamentals 		Keith O'Shea Program Management	Yes
WA	Leader Group Australasia Pty Ltd	<ul style="list-style-type: none"> • Short: Project Management Fundamentals • Certificate IV in Project Management • Diploma of Project Management • Advanced Diploma of Project Management 	<ul style="list-style-type: none"> • Classroom • Face to face • e-Learning • Distance • Workshop • Classes/On-site (NB in-house only) • Online (NB In-house & Public) • Web-based • Campus • Tutorial • Fast track • Workplace based assessment 	Leader Group Australasia Pty Ltd	Yes
VIC	Learning Seat	<ul style="list-style-type: none"> • Short: Managing Projects • Certificate IV in Project Management 	<ul style="list-style-type: none"> • e-learning • web-based training 	Learning Seat	Yes
NSW	Living Planit Pty Ltd	<ul style="list-style-type: none"> • Short: Project Management • Short: Fundamentals in Project Management • Certificate IV in Project 	<ul style="list-style-type: none"> • Classroom • Face-to-Face 	Living Planit Pty Ltd	Yes

		<p>Management</p> <ul style="list-style-type: none"> • Diploma of Project Management • Advanced Diploma of Project Management 			
SA	Mike Nolan Management Services Pty Ltd	<ul style="list-style-type: none"> • Certificate IV in Project Management • Certificate IV in Government (Project Management) • Diploma in Government (Project Management) • Diploma of Project Management • Advanced Diploma of Project Management 	<ul style="list-style-type: none"> • Face to face • in-house and public 	Mike Nolan Management Services Pty Ltd	Yes
SA	Panurgem Pty Ltd	<ul style="list-style-type: none"> • Short: Project Management Framework 	<ul style="list-style-type: none"> • Workshop (NB in-house only • not publicly available) 	Panurgem Pty Ltd	No
VIC	Parker Brent Pty. Ltd.	<ul style="list-style-type: none"> • Certificate IV in Project Management • Diploma of Project Management • Advanced Diploma of Project Management 	<ul style="list-style-type: none"> • Face to face • personal coaching • and distance learning 	Parker Brent Pty. Ltd.	Yes
NSW	Project Management Partners Pty Ltd	<ul style="list-style-type: none"> • Certificate IV in Project Management • Diploma of Project Management 		Project Management Partners Pty Ltd	Yes
NSW	Project Managers Network Pty Ltd	<ul style="list-style-type: none"> • Short: Project Management Practitioners 	<ul style="list-style-type: none"> • Workshop - 3 days 	Project Managers Network Pty Ltd	No
NSW	Proton Projects Pty	<ul style="list-style-type: none"> • RegPM Assessment 	<ul style="list-style-type: none"> • Classroom • Face to face 	Proton Projects Pty	Yes

	Ltd	<ul style="list-style-type: none"> Preparation Short: Project Management Diploma of Project Management 	<ul style="list-style-type: none"> Workshop Classes/On-site (NB In-house & Public) Workplace based assessment 	Ltd	
QLD	Queensland University of Technology	<ul style="list-style-type: none"> Graduate Certificate (Project Management) Graduate Diploma Project Management Master of Project Management 	<ul style="list-style-type: none"> Classroom Face to face Online 	Queensland University of Technology	No
NSW	Sigma Management Science	<ul style="list-style-type: none"> Managing Projects for Outcomes 	<ul style="list-style-type: none"> Face to face Classes/On-site (NB In-house & Public) 	Sigma Management Science	Yes
NSW	SkillSoft Asia Pacific	<ul style="list-style-type: none"> 36 PMBOK® Based Courses 	<ul style="list-style-type: none"> e-Learning Online Web-based 	SkillSoft Asia Pacific	Yes
VIC	Strategic Management Group Inc	<ul style="list-style-type: none"> Project Leadership Live 	<ul style="list-style-type: none"> Face to Face 	Strategic Management Group Inc	No
VIC	Swinburne University SIS	<ul style="list-style-type: none"> Certificate IV in Project Management Diploma of Project Management 	<ul style="list-style-type: none"> Face-to-Face inhouse and online delivered Nationally 	Swinburne University SIS	Yes
NSW	TAFE NSW	<ul style="list-style-type: none"> Certificate IV in Project Management Certificate IV in Government (Project Management) Diploma in Government (Project Management) Diploma of Project Management Advanced Diploma of Project Management 	<ul style="list-style-type: none"> Classroom Face to face Distance Workshop Classes/On-site (NB In-house & Public) Campus Tutorial Fast track Workplace based assessment Custom delivery 	TAFE NSW	No
NSW	TAFE NSW - Hunter Institute &	<ul style="list-style-type: none"> Certificate IV in Project 	<ul style="list-style-type: none"> Face to Face 	TAFE NSW - Hunter Institute &	No

	Living Planit Pty Ltd	<p>Management</p> <ul style="list-style-type: none"> • Diploma Business Solutions through Project Competence 		Living Planit Pty Ltd	
VIC	Thomsett International	<ul style="list-style-type: none"> • 36 PMBOK® Based Courses • Short: Project Management Fundamentals • Short: PM Essential Techniques • Short: PM Advanced Techniques • Short: Extreme PM Masterclass 	<ul style="list-style-type: none"> • Classroom • Face to face • Workshop • (NB In-house & Public) 	Thomsett International	Yes
ACT	Transformed	<ul style="list-style-type: none"> • RegPM Assessment Preparation • Short: Introduction to Project Management • Short: Project Management • Short: Project Management Part 1 • Short: Project Management Part 2 • Short: Project Management Part 3 • Short: Practical Project Management • Short: Risk Management in Projects • Short: Contract Management • Short: Practical Program Management • Short: Quality Management in Projects • Certificate IV in Project 		Transformed	No

		<p>Management</p> <ul style="list-style-type: none"> • Certificate IV in Government (Project Management) • Diploma in Government (Project Management) • Diploma of Project Management • Advanced Diploma of Project Management 			
NSW	UNE Partnerships	<ul style="list-style-type: none"> • Certificate IV in Project Management • Diploma of Project Management • Advanced Diploma of Project Management 	<ul style="list-style-type: none"> • Distance education • tutorial workshops • in-house workshops • RPL or combination of the previous. 	UNE Partnerships	Yes
QLD	University of Queensland - Department of Geographical Sciences and Planning	<ul style="list-style-type: none"> • Graduate Certificate (Project Management) • Graduate Diploma Project Management • Master of Project Management 	<ul style="list-style-type: none"> • Classroom/lecture. 	University of Queensland - Department of Geographical Sciences and Planning	No
SA	University of South Australia - Natural & Built Environments	<ul style="list-style-type: none"> • Graduate Certificate (Project Management) • Graduate Diploma Project Management • Master of Project Management 	<ul style="list-style-type: none"> • Classroom/Lecture in Adelaide • Workshops/tutorials & distance education in Hong Kong. 	University of South Australia - Natural & Built Environments	No
QLD	University of Southern Queensland - Faculty of Business	<ul style="list-style-type: none"> • Postgraduate Certificate (Project Management) • Postgraduate Certificate in Management (Project Management) 	<ul style="list-style-type: none"> • Classroom • Face to face • e-Learning • Distance • Workshop • Classes/On-site • Online • Web-based 	University of Southern Queensland - Faculty of Business	Yes

		<ul style="list-style-type: none"> • Master of Project Management 	<ul style="list-style-type: none"> • Campus • Tutorial 		
NSW	University of Sydney Project Management Graduate Program	<ul style="list-style-type: none"> • Graduate Certificate (Project Management) • Graduate Diploma Project Management • Master of Project Management 	<ul style="list-style-type: none"> • Classroom 	University of Sydney Project Management Graduate Program	No
NSW	University of Technology Sydney (UTS) - Faculty of Design, Architecture and Building	<ul style="list-style-type: none"> • Short: Continuing Professional Education • Graduate Certificate (Project Management) • Master of Project Management 	<ul style="list-style-type: none"> • Face to face workshops and lectures at UTS Sydney and ESC Lille • France 	University of Technology Sydney (UTS) - Faculty of Design, Architecture and Building	No
NSW	URS Asia Pacific	<ul style="list-style-type: none"> • Project Management Certification Program 	<ul style="list-style-type: none"> • Online • Face to face workshops • NB In house only 	URS Asia Pacific	Yes

Appendix 2 – Dollar Value of Projects Managed by Respondents

pmamount Largest project managed

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid \$0.3M	1	1.6	1.6	1.6
\$100M	3	4.9	4.9	6.6
\$10M	3	4.9	4.9	11.5
\$11.7m	1	1.6	1.6	13.1
\$110m	1	1.6	1.6	14.8
\$11M	1	1.6	1.6	16.4
\$13.26M	1	1.6	1.6	18.0
\$135m	1	1.6	1.6	19.7
\$13M	1	1.6	1.6	21.3
\$14M	1	1.6	1.6	23.0
\$150,000,000	1	1.6	1.6	24.6
\$150M	1	1.6	1.6	26.2
\$15m	1	1.6	1.6	27.9
\$165M	1	1.6	1.6	29.5
\$18M	2	3.3	3.3	32.8
\$2.53M	1	1.6	1.6	34.4
\$20.6M	1	1.6	1.6	36.1
\$20M	4	6.6	6.6	42.6
\$21M	1	1.6	1.6	44.3
\$2m	1	1.6	1.6	45.9
\$2M	2	3.3	3.3	49.2
\$300M	1	1.6	1.6	50.8
\$30M	1	1.6	1.6	52.5
\$35m	1	1.6	1.6	54.1
\$4.5m	1	1.6	1.6	55.7
\$400M	1	1.6	1.6	57.4
\$48M	2	3.3	3.3	60.7
\$500M	1	1.6	1.6	62.3
\$50M	1	1.6	1.6	63.9
\$52M	1	1.6	1.6	65.6
\$650M	1	1.6	1.6	67.2
\$680m	1	1.6	1.6	68.9
\$68M	1	1.6	1.6	70.5
\$70M	1	1.6	1.6	72.1
\$750M	1	1.6	1.6	73.8
\$75M	1	1.6	1.6	75.4
\$8.84M	1	1.6	1.6	77.0
\$80M	2	3.3	3.3	80.3
\$82M	1	1.6	1.6	82.0
1000000	1	1.6	1.6	83.6
10m	1	1.6	1.6	85.2
250m	1	1.6	1.6	86.9
4 Million	1	1.6	1.6	88.5
4.5m	1	1.6	1.6	90.2
5m	1	1.6	1.6	91.8
8 million pounds	1	1.6	1.6	93.4
ARC grant?	1	1.6	1.6	95.1
c\$500m - \$1bn	1	1.6	1.6	96.7
nil	1	1.6	1.6	98.4
Unknown	1	1.6	1.6	100.0
Total	61	100.0	100.0	

Appendix 3 – Questionnaire

Dear Participant

Thank you for your participation and time (approximately 30 - 40 minutes), please complete fully prior to returning.

This questionnaire` will help establish the current project management knowledge areas and their frequency of use.

Please insert the relevant value (number) adjacent to the criteria.

At the end of this questionnaire are two open questions and an area to insert any knowledge areas not listed, your response to these questions will be most appreciated

Thank you again

Kind regards
Keith O'Shea - keithoshea@westnet.com.au

QUESTIONS	Answers
Male or Female?	<input type="text"/>
Current age?	<input type="text"/>
Current industry or business sector?	<input type="text"/>
How many years have you been at or above project manager level?	<input type="text"/>
Original training, e.g. trade, Engineer, Architect, Accountant, other?	<input type="text"/>
Years in original trained occupation prior to engaging in project management?	<input type="text"/>
Project management qualifications or awards?	<input type="text"/>
Months since receiving qualification or award?	<input type="text"/>
Largest dollar value of project managed by you?	<input type="text"/>

Integration Management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I identify stakeholders with the guidance of higher project authorities to determine the influence of others on project outcomes	
I review all project management functions with guidance of higher project authorities and other relevant stakeholders, to determine achievable project objectives	
I develop the project plan based on requirements of project sub-plans, agreed by higher project authority and implemented as the basis for project management	
I implement designated project control mechanisms to accommodate and manage change throughout the project life cycle	
I maintain established links to align project objectives with organisation objectives throughout the project life cycle	
Where necessary I seek higher authority assistance to resolve conflicts between achievement of project objectives and accommodation of requirements of other levels of management within the organisation	
I implement agreed project phases, approval points and review points	
I report progress in relation to established project baselines to provide a measure of performance throughout all phases of the project life cycle	
I implement established finalisation plans, procedures and activities to ensure final outcomes of project phases and of the overall project meet the predetermined agreed project objectives	
I ensure Integration management issues and recommended improvements are identified, documented and passed on to higher project authority for application in future projects	
Sub Total	0
Scope Management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I confirm project authorisation with higher authority	
I identify project objectives, deliverables, constraints and principal work activities	

I establish designated measurable project benefits and outcomes to enable quantified evaluation of project performance	
I develop scope management plans and implement them to ensure clarity of understanding and ongoing management of project scope	
I manage the impact of scope change within established time, cost and quality constraints to meet project objectives	
I review progress and the results recorded to assess the effectiveness of scope management procedures	
I ensure scope management issues and recommended improvements are identified, documented and passed on to higher project authority for application in future projects	
Sub Total	0
Time Management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I determine the duration, effort, sequence and dependencies of tasks, as the basis for the project schedule	
I select established time management methods, techniques and tools to determine preferred schedule, time management plans, resource allocation and financial requirements	
I obtain agreement to the schedule from higher project authority and communicate it to stakeholders to provide the basis for measurement of progress	
I implement mechanisms to measure, record and report progress of activities in relation to the agreed schedule and plans	
I conduct ongoing analysis of options to identify variances and forecast the impact of changes on the schedule	
I review progress throughout the project life cycle and agreed schedule changes are implemented to ensure consistency with changing scope, objectives and constraints related to time and resource availability	
I develop responses to perceived, potential or actual schedule changes agreed by higher project authority, and implement them to maintain project objectives	
I review project outcomes to determine the effectiveness of time management activities	
I identify time management issues and recommended improvements are passed on to higher project authority for application in future projects	
Sub Total	0

Cost Management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I determine resource requirements for individual tasks to provide a basis for attributing expenditure	
I ensure project costs are estimated to enable budgets to be developed and agreed cost management processes implemented at an appropriate level throughout the project life cycle	
I ensure cost management plans are developed and implemented to ensure clarity of understanding and ongoing management of project finances	
I implement agreed financial management procedures and processes to monitor actual expenditure and to control costs	
I select cost analysis methods and tools to identify cost variations, evaluate options and recommend actions to higher project authority	
I implement agreed actions, monitor and modify them, to maintain financial and overall project objectives, throughout the project life cycle	
I conduct activities to signify financial completion	
I review project outcomes to determine the effectiveness of cost management processes and procedures	
I ensure cost management issues and recommended improvements are identified, documented and passed on to higher project authority for application in <u>future</u> projects	
Sub Total	0
Quality Management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I determine quality objectives, standards and levels with input from stakeholders to establish the basis for quality outcomes	
I select established quality management methods, techniques and tools to determine preferred mix of quality, capability, cost and time	
I ensure quality criteria are identified, agreed with higher project authority and communicated to stakeholders to ensure clarity of understanding and achievement of quality and overall project objectives	
I include quality requirements in project plans and implement as a basis for performance measurement	

I ensure results of project activities and product performance are measured and documented throughout the project life cycle to determine compliance with agreed quality standards	
I ensure causes of unsatisfactory results are identified and in consultation with the client, appropriate actions are recommended to enable continuous improvement in quality outcomes	
I ensure inspections of quality processes and quality control results are conducted to determine compliance of quality standards to overall quality objectives	
I ensure a quality management system is maintained to enable effective recording and communication of quality issues and outcomes	
I ensure processes are reviewed and agreed changes implemented continually throughout the project life cycle to ensure continuous improvement of quality	
I ensure project outcomes are reviewed against performance criteria to determine the effectiveness of quality management processes and procedures	
I ensure lessons learned and recommended improvements are identified and documented	
Sub Total	0
Resource Management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I determine resource requirements for individual tasks to provide a basis for determining project staffing levels and competencies	
I establish project organisation and structure designated by higher authority to align individual and group competencies with project tasks	
I ensure staff are allocated to and within the project or reallocated within the organisation as directed by higher project authority to meet competency requirements throughout the project life cycle	
I communicate designated staff responsibilities, authority and personal performance measurement criteria to ensure clarity of understanding of the work and to provide a basis for ongoing assessment	
I identify ongoing development and training of project team members, approved by higher authority and implemented to achieve HRM and overall project objectives	
I ensure individuals' performance is measured against agreed criteria and actions are initiated to overcome shortfalls in performance and encourage career progression	
I implement processes to promote continuous improvement of staff to improve staff and overall project effectiveness	

I monitor internal and external influences on individual and team performance and morale and if necessary remedial action is taken	
I implement established procedures for interpersonal communication, counselling and conflict resolution to maintain a positive working environment	
I identify and manage inter-project and intra-project conflict to minimise impact on achievement of project objectives	
I ensure HRM management issues and recommended improvements are identified and documented	
Sub Total	0
Communication Management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I identify Information requirements and ensure they are documented and analysed as the basis for communications planning	
I implement the designated project management information system, structure and procedures to ensure the quality, validity, timeliness and integrity of information and communication	
I manage the generation, gathering, storage, retrieval, analysis and dissemination of information by project staff and stakeholders within established systems and procedures to aid decision making processes throughout the project life cycle	
I ensure designated information validation processes are monitored and controlled, and agreed modifications implemented to optimise quality and accuracy of data	
I implement processes to promote continuous improvement of staff to improve staff and overall project effectiveness	
I maintain customer relationships within established guidelines to ensure clarity of understanding of objectives and to reduce conflict throughout the project life cycle	
I ensure finalisation activities are conducted to ascertain agreed ownership of and responsibility for information	
I ensure project outcomes are reviewed to determine the effectiveness of management information and communications processes and procedures	
Sub Total	0
Risk Management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I identify potential, perceived and actual risk events as the basis for risk management planning	

I use established risk management techniques and tools to analyse risk events, assess options and recommend preferred risk approaches	
I develop plans agreed with stakeholders and communicate to ensure clarity of understanding and ongoing management of risk factors	
I ensure the project is managed in accordance with established project and risk management plans	
I monitor progress against project plans to identify variances and recommend responses to higher project authority for remedial action	
I ensure agreed risk responses are implemented and plans modified to reflect changing project objectives in an environment of uncertainty	
I ensure project outcomes are reviewed to determine effectiveness of risk management processes and procedures	
I ensure risk issues and recommended improvements are identified and documented	
Sub Total	0
Procurement management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I identify procurement requirements with input from stakeholders and guidance of higher project authorities, as the basis for procurement planning and the contract	
I implement agreed procurement management plans and strategies to ensure clarity of understanding between stakeholders and achievement of project objectives	
I obtain Information from established sources capable of fulfilling procurement requirements to determine the extent to which project objectives can be met	
I implement established selection processes and selection criteria and communicate to stakeholders and prospective contractors to ensure fair competition	
I obtain approvals from higher project authority to enable formal discussions to be conducted	
I communicate agreed proposals to prospective contractors to ensure clarity of understanding of project objectives	
I evaluate responses and preferred contractors are selected in accordance with current legal requirements and agreed selection processes	
I negotiate with preferred contractor, with guidance of higher project authority if necessary, to agree contract terms and conditions, establish common goals and minimise uncertainty	

I ensure established procurement plans are implemented, and modified with higher project authority approval, to ensure common approach to achievement of objectives	
I review progress and manage agreed changes to ensure timely completion of tasks, resolution of conflicts and achievement of project objectives within the legal framework of the contract	
I identify procurement management problems and report to higher project authorities, and agreed remedial actions are implemented to ensure project objectives are met	
I conduct finalisation activities to ensure contract deliverables meet contractual requirements	
I review project outcomes to determine the effectiveness of procurement processes and procedures	
I ensure lessons learned and recommended improvements are identified and documented	
Sub Total	0
Administration Management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I manage change control	
I manage the setting up and maintaining of project files	
I establish document control procedures	
I collect actuals data and forecasts	
I manage the update of plans	
I administer the Quality Review process	
I administer Project Board meetings	
I assist with the compilation of Reports	
Sub Total	0
Assurance Management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I ensure risks are being controlled	
I ensure adherence to the Business Case	
I apply constant reassessment of the value-for-money solution	

I ensure fit with the overall program or company strategy	
I ensure the project remains viable	
I ensure the scope of the project is not 'creeping up' unnoticed	
I ensure the focus on the business need is maintained	
I ensure internal and external communications are working	
I ensure any applicable standards are being used	
I ensure any legislative constraints are being observed	
I ensure the needs of specialist interests, for example, security, are being observed	
I ensure adherence to quality assurance standards.	
Sub Total	0
General Management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I direct and motivate the project team	
I plan and monitor the project	
I agree any delegation and use of project assurance roles required by the Project Board/Steering Committee	
I produce the Project Initiation Document (PID)	
I prepare project, stage and if necessary exception plans	
I manage business and project risks, including the development of contingency plans	
I liaise with program management if the project is part of a program	
I liaise with program management or related projects to ensure that work is neither overlooked nor duplicated	
I take responsibility for overall progress and use of resources, and initiate corrective action	
I am responsible for change control and any required document management	
I report to the Project Board/Steering Committee through highlight reports and stage assessments	
I Agree technical and quality strategy with appropriate members of the Project Board/Steering Committee	
I prepare the lessons learned report	
I prepare any follow-on action recommendations required	

I prepare the end project report	
I am responsible for project administration	
I liaise with any suppliers or account managers.	
Sub Total	0
Client-side management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I ensure the desired outcome of the project is specified	
I make sure that progress towards the outcome required by the client remains consistent from the client perspective	
I promote and maintain focus on the desired project outcome	
I ensure that any client resources required for the project are made available	
I approve product descriptions for those products which act as inputs or outputs (interim or final) from the supplier function, or will affect them directly and that the products are signed off once completed	
I prioritise and contribute client opinions on project board decisions on whether to implement recommendations on proposed changes	
I resolve client requirements and priority conflicts	
I provide the client view on recommended follow-up actions	
I Brief and advise client management on all matters concerning the project.	
I ensure the specification of the client's needs is accurate, complete and unambiguous	
I ensure impact of potential changes is evaluated from the client point of view	
I ensure risks to the client are constantly monitored	
I ensure quality control procedures are used correctly to ensure products meet client's requirements	
Sub Total	0

Executive Management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I ensure that a tolerance is set for the project in the project brief	
I authorise customer expenditure and set stage tolerances	
I approve the end project report and lessons learned report	
I brief corporate or program management about project progress	
I organise and chair Project Board meetings	
I recommend future action on the project to corporate or program management if the project tolerance is exceeded	
I approve the sending of the notification of project closure to corporate or program management	
I manage validation and monitoring of the Business Case against external events and against project progress	
I monitor project finance on behalf of the Client	
I monitor the business risks to ensure that these are kept under control	
I monitor any supplier and contractor payments	
I monitor changes to the project plan to see if there is any impact on the needs of the business or the project Business Case	
I assess the impact of potential changes on the Business Case and Project Plan	
I constrain client-side and supplier excesses	
I Inform the project of any changes caused by a program of which the project is a part	

I monitor stage and project progress against the agreed tolerances.	
Sub Total	0
Supplier-side Management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I agree objectives for specialist activities	
I make sure that progress towards the outcome remains consistent	
I promote and maintain focus on the desired project outcome from the point of view of the supplier	
I ensure that the supplier resources required for the project are made available	
I approve product descriptions for supplier products	
I contribute supplier opinions on Project Board decisions	
I resolve supplier requirements and priority conflicts	
I arbitrate on, and ensure resolution of any supplier priority or resource conflicts	
I brief non-technical management on supplier aspects of the project.	
I advise on the selection of development strategy, design and methods	
I ensure that any supplier and operating standards defined for the project are met	
I monitor potential changes and their impact on the correctness, completeness and integrity of products against their product description from a supplier perspective	
I monitor any risks in the production aspects of the project	
I ensure quality control procedures are used correctly so that products adhere to requirements	

Sub Total	0
'People-specific' Management - (1) = I have never done or participated (2) = I have only done under supervision (3) = I have done without supervision (4) = I have often done or currently do (5) = I have managed across multiple projects	Number?
I have identified the culture of the 'parent' organisation or client	
I have attempted to modify/change the culture of the organisation or client	
I have promoted active disagreement in the project team	
I have Intentionally created personal friendships in the project team	
I have Intentionally created a collective vision for the project team	
I regularly engage in 'face to face' updates with team members	
I regularly engage in 'face to face' updates with <u>stakeholders</u>	
Sub Total	0

Grand Totals 0

Are there any knowledge areas that you utilise, not listed above? If so; can you please list them and rate as previous.	Number?
Sub total	0

What do you regard as your strongest knowledge area in project management?

What do you regard as your weakest knowledge area in project management?

